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Paint
Questions
ANSWERED

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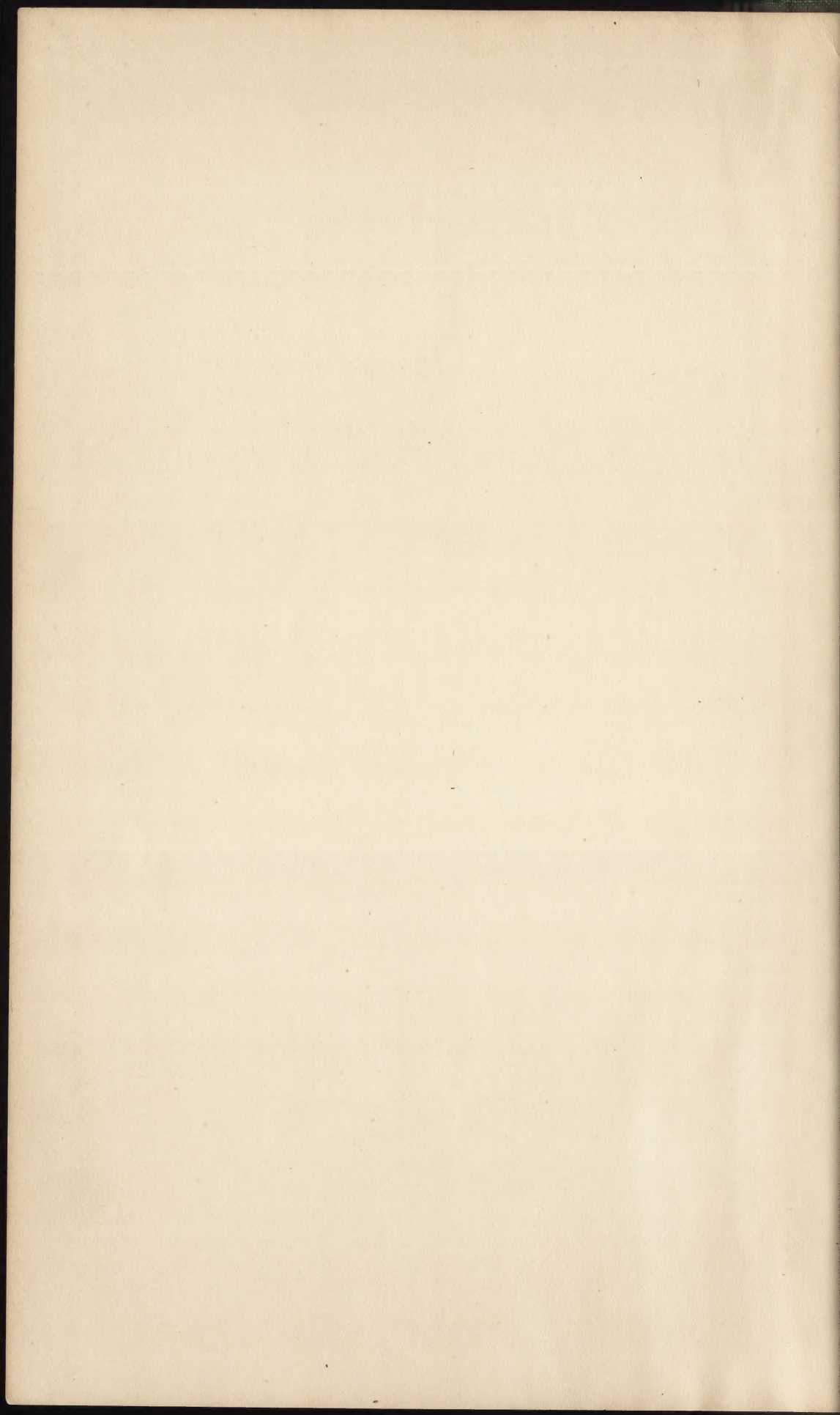
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Why ask for the moon
When we have the stars?

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739

PAINT QUESTIONS ANSWERED

A REFERENCE ENCYCLOPEDIA ANSWERING KNOTTY PROBLEMS
THAT CONFRONT THE PAINTER, DECORATOR,
AND PAINT MANUFACTURER IN
THEIR EVERYDAY WORK
WITH COMPLETE TOPICAL INDEX

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New York

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PREFACE.

For several years past, one of the most valuable features of The Painters Magazine has been its department of Questions Answered, to which its subscribers have been invited and encouraged to send the various knotty problems and difficulties that they have met with in their daily business. No effort nor expense has been spared to answer every question submitted, and to supply the subscribers with thoroughly up-to-date and practical information based on present day American usage. The fact that questions have been received from every part of the United States and Canada, as well as from many other parts of the globe where the English language is spoken, shows how fully this feature of The Painters Magazine has been appreciated.

We have long believed that these practical answers to actual questions on almost every paint topic would become still more valuable to the progressive craftsmen if they were gathered together in such form that they might be always at hand, ready for reference; and the present volume, in which 739 of them are gathered together, is the outcome of that belief.

In reprinting the Questions answered from The Painters Magazine we have omitted the initials and location of the questioners, and instead of reprinting their letters, we have stated concisely the conditions of the particular case concerning which information was requested, or have summarized it in the title of the paragraph or section.

The index, which will be found at the end of the book, has been made very complete, so that any particular subject may be readily found. We would suggest, in looking up any special information wanted, that all the paragraphs referred to in the index should be consulted.

It is hoped that this book will meet with the approval of the craft at large, and it is hereby dedicated to the painters and decorators throughout the entire Country.

The publishers would esteem it a favor if any of the readers would call their attention to any errors which may have crept into the book in order that they may be corrected in subsequent editions. The amount of detail involved in the preparation of this book is so great that we can scarcely dare hope that it is entirely free from errors, though we believe it to be as nearly correct in every particular as it is possible to make it.

New York, 1904.

PREFACE

For several years past one of the most valuable features of the *Journal of the American Medical Association* has been its department of Questions and Answers, to which its contributors have been invited and encouraged to send the various medical problems and difficulties that they have met with in their daily practice. It is a relief to a busy physician to find his answer to a question submitted to him by the medical profession, and it is a pleasure to the contributors to find that their questions have been answered. The fact that questions have been answered from every part of the United States and Canada, as well as from many other parts of the globe, is a proof of the value of this department. It is a pleasure to the contributors to find that their questions have been answered.

The time has long since passed when the medical student or the physician on a distant every night, could depend on the *Journal of the American Medical Association* for the answers to his questions. The time has long since passed when the medical student or the physician on a distant every night, could depend on the *Journal of the American Medical Association* for the answers to his questions.

In reviewing the *Journal of the American Medical Association*, it is a pleasure to find that the department of Questions and Answers has been a valuable feature of the *Journal of the American Medical Association* for many years. It is a pleasure to find that the department of Questions and Answers has been a valuable feature of the *Journal of the American Medical Association* for many years.

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Paint Questions Answered

— 1 —

Preparing Quick Drying Flake White for Striping.

To make flake white flow freely from the striping pencil, mix a few drops of a good, pale rubbing varnish with your flake white as it comes from the tube or can, and should it be very stiff, thin with a few drops of turps before adding the varnish.

— 2 —

Remedy for Clouded Effect of Stain and Varnish.

To remove a cloudy and uneven effect on old furniture that has been cleaned off, stained and varnished, take powdered pumice and water, and with a piece of felt rub down the varnish until it becomes dead flat, then rinse with sponge and clear water and dry with chamois skin. Now glaze the furniture in oil or water and use the mottler to have the glaze good and uniform, and when thoroughly dry apply your varnish, but not before you have tried it on a small piece. Your stain probably dried too rapidly in the first place, therefore the clouded effect.

— 3 —

Madder Lakes and Alizarine Lakes.

The madder plant, which was extensively cultivated in Greece, Holland and the south of France up to 25 years ago, and from whose glucosides the coloring matter of madder lake was derived, has given way to the coloring matter artificially manufactured from the anthracene of coal tar, the chief coloring matter, alizarine and purpurin, being present in both the madder plant and in coal tar. Without going into the details of their manufacture, we can safely say, on the basis of tests made by reliable parties, extending upwards of ten years, that alizarine lake, well made, is superior in point of brilliancy and permanency to true madder lake, especially when used as an oil color, or when protected by varnish. We know of several cases where alizarine red lake has stood exposure to strong light for nearly 10 years without any other change than that brought about by the bleaching of the oil. Though not originally as brilliant as French carmine, it will outlast the latter four to one in point of stability of color.

— 4 —

Filling in of Cracks in Plastered Walls.

Trouble occurred in repainting an old plastered wall, the filled-in cracks showing much darker than the rest of the surface. From the statement of the painter it appeared that he had simply cut out the cracks and filled them with a plaster of paris putty without, however, taking the precaution to stop the suction in the new plaster, with which the cracks were filled. While it is perfectly proper to fill in cut-out cracks in old walls with plaster, which is mixed with a thin glue size, the plaster should, as soon as it becomes hard, be coated with white shellac varnish, or better still, fill in the shrinkage with hard glazier's putty (previously mixed with some dry lead and a trifle of good japan). This dry, sandpaper down to the level of the wall and coat the putty with paint of the color that is on the wall. Should one coat dry too flat, give another, and if necessary, still another, until the filled-in portions match the old effect. When this is done there will be no absorption, and consequently the old cracks will not show through after repainting. We do not think that the cause of the trouble was either in the plaster or in the paint, for in that case defects should have been found on the rest of the surface.

— 5 —

Oak Graining Over White Paint.

In the case of some oak graining over white paint the graining color and varnish scaled off. It was required to do the work over, without going to the expense of burning off, and yet avoid the same trouble of scaling off to the ground coat.

What is wanted is to know how to get the whole thing off, new varnish and graining coat and the old paint, in the quickest and cheapest way other than burning off. In other words, what is required is a good, cheap formula for a paint remover. Well, there are a good many—some of them are good and some not so good. We will give you some good ones. They are, any and all of them, very easily made and will cost you but a very few pennies per pound to make.

Take of pure caustic soda, that would be 98 per cent. goods, a pound. Dissolve that in two pounds of warm water. The warmer the water the quicker it will dissolve. While this is dissolving, mix in another receptacle two ounces of common starch, preferably corn starch, and two ounces of china clay with two pounds of cold water. Add the water a little at a time, not all at once.

When the soda solution gets cold mix the two together, and stir till they come to a smooth paste.

Apply this to the paint surface to be removed, spread it on rather thick; that is, smear the surface well over with the paste. Let it remain a few minutes, till it has done its work. You can easily see by a trifling examination when the paint is well loosened. Then it can all be removed with a scraper, putty-knife or an old brush. Clean off to the wood, and after you have scraped it well to get all the paste out, it will be best to wash it off with clean water. If there is still any evidence of the paste left (this will be shown by the soapy taste or feel to

the fingers) it will be best to wash the surface in weak vinegar. Simply take a little vinegar and water, and with a cloth wash over the surface and dry it. This is not likely to be necessary, if you have properly handled the paste.

Another remover is made by making a strong caustic soda solution, as in the previous case. Mix this to a brushing paste with terra-alba, or for that matter whiting will do as well. Spread this over the surface to be removed and let it dry there. Then wash off with hot water. Still another is made in this way: Dissolve eight pounds of caustic soda in five gallons of water. Best to use hot water, as stated in the above. Take ten pounds of whiting and make it into a very stiff paste with cold water, add to this about four gallons of the caustic soda solution. Mix in another receptacle two and a half pounds of potato starch with a little water, just enough to make a paste of it. Add this to the other and mix well. Don't add hot water to the starch. Use cold water only. After this is mixed it is made much better by running through a paint mill. You will find this makes a good remover.

To make a liquid remover, take a quart of the caustic soda solution in the formula just given and add to it four gallons of water. That will take off almost anything.

Another liquid remover is made by taking three pounds of concentrated lye (potash) and dissolving it in twelve pounds of water and adding to this two pounds of acetate (gray) of lime. Boil these gently and let settle and pour off the clear supernatant liquor.

Any of those given will answer the purpose for which they are intended. When your old paint, etc., is off, go to work building up the ground coat for graining. Keep your ground flat and you will have no trouble. It is very likely that the trouble in the old job was due to the graining being put on over old paint, which might have been a little greasy, as is usually the case with old paint on the inside of a house. It may not have seemed greasy, but it might have been so nevertheless, and if the graining color was water ground, which is very likely to have been the case, you at once see where all that trouble came from. The graining color dried on that surface which was very slightly oily or greasy. Then came the varnish coat, which pulled the distemper coat off the ground—rather, off the oily or greasy surface.

— 6 —

Amount of Thinners Required for White Lead Paint and Zinc White Paint for Exterior Use.

The general consensus of opinion among practical painters of our acquaintance is that 100 lbs. of strictly pure white lead in oil should be of proper consistency for the finishing coat when thinned with $4\frac{3}{4}$ gallons raw linseed oil and $\frac{1}{4}$ gallon liquid drier, and that 100 lbs. of strictly pure zinc white in oil is of the right consistency for finishing when thinned with $7\frac{1}{2}$ gallons raw linseed oil and $\frac{1}{2}$ gallon liquid drier, the percentage of drier to be changed in each case, according to the conditions of atmosphere and temperature.

— 7 —

Painting on Cement Surfaces.

We do not know how long a cemented surface should stand exposed before it is safe to paint on, as it depends very much on the quality of the cement. It is safe to say that after it has stood for a year, there will be no risk of paint being thrown off, provided the surface is well washed and rinsed with clear water and allowed to dry.

For comparatively fresh cemented surface the sulphuric acid treatment is safest and best. To one gallon of water take 12 fluid ounces of oil of vitriol and wash the surface with this solution. This treatment will turn any excess of lime in the cement into sulphate of lime and give a uniformly absorbent surface to paint upon. If the surface has been made and exposed for a month or so, a wash made by dissolving four ounces of bicarbonate of ammonia in two gallons of water will be found more efficient than the dilute sulphuric acid wash, and the surface may be primed as soon as it has become dry.

As to the mixing and thinning of the paint for the various coats, we should suggest a similar treatment as is usual for preparing paint for plastered walls; that is, an oily priming in all cases, succeeding coats depending on the finish desired, flat or glossy.

— 8 —

Enamel Paint on Cement Surfaces.

Enamel paint should not be applied direct to cement surface, but should be treated same as a plaster wall, for reasons of economy and durability. We do not know of any enamel preparation that will stand the action of cement, when the surface is not treated as above stated.

— 9 —

Testing Turpentine for Purity.

The very simplest method is to draw a small portion of the suspected article into a clean vessel and place a drop thereof on a clean piece of white paper (letter file paper is best) and watch for the disappearance of the spot made by the drop. Unless the spot has disappeared completely and the paper assumed its original condition within five or six minutes the turpentine is either adulterated with mineral oil or it is fatty to such an extent that it is unfit for the use of the coach painter or for inside work. If there be a decided grease spot, that will not disappear in 10 to 15 minutes, admixture with mineral oil may be taken for granted.

It would be well for the purchaser of large quantities of turpentine to provide himself with a Baume hydrometer for testing turps, a hydrometer jar and a thermometer, when he can fill the jar with turps, bring the same to a temperature of 60 deg. F., insert the hydrometer, and if the goods be pure the specific gravity indicated must not be less than 0.863 nor more than 0.866, the exact specific gravity of American spirits of turpentine being 0.8643 at that temperature, and the weight of a United States standard gallon 7 lbs. 3½ ounces, though the commercial custom makes 7 lbs. equal one gallon of turpentine.

— 10 —

Removing Dust, Dirt and Smoke from Painted Ceilings and Walls.

Make very liberal use of dust brush, sponge, brush, soap and water and last, but not least, elbow-grease.

— 11 —

Harmony in Graining in Maple.

If you wish to go to the trouble of graining the beads in the casings in a room that is to be grained in maple, dark cherry will do very well, but if you simply wish to paint the beads to produce a harmonious effect with the graining in maple, we should advise you to use a silver gray tint or an ivory tint, made with raw sienna, or a subdued tint of old rose. A very pretty effect can be had by bronzing the beads with aluminum or gold.

— 12 —

Most Permanent Black.

Real ivory black resists strong light permanently.

— 13 —

Removing Paint from Hardwood Furniture.

Try a mixture of two parts of aqua ammonia of 18 deg. and one part spirits of turpentine, which will soften the paint so that it can be removed with the spatula or scraper. However, you must be careful not to dig into the wood, but rather make several applications of the mixture, and finally use a stiff brush to remove the paint from the grain of the wood. The turpentine in the mixture prevents the ammonia from raising the wood fibre. When every particle of paint is removed, wash the surface once more with clear turps and allow to dry thoroughly before attempting the usual finishing process.

— 14 —

White Spots on Varnished Surfaces.

When varnish contains very little oil, or when made from inferior material or when it is made, as a prominent chemist and varnish maker puts it, from resinate of lime only, then it will always show this undesirable effect.

— 15 —

Composition of Flesh Color.

Flesh color is usually made by mixing French ochre and English vermilion, but the principal requisites are that the painter has the necessary talent to paint faces.

— 16 —

Durable Paint for the Interior of Iron Storage Tanks for Turpentine.

We should say that any paint which is composed of a medium that is insoluble in turpentine and not softened by the contact with turpentine, and which will adhere to the iron, would keep the liquid from becoming discolored. Shellac varnish would, most likely, suit best, especially if mixed with a colorless pigment.

— 17 —

Testing the Purity of Gold Leaf.

Put a few drops of nitric acid upon a piece of glass and place thereon a small piece of the leaf. Pure gold leaf will not be affected by the acid, while other metals that may be mixed with it will go into solution. A small percentage of copper is usually present in the best gold leaf, not as an adulterant, but in order to make it more workable.

— 18 —

Removing Varnish from Old Oil Paintings on Canvas.

Under no condition must ammonia, no matter how much diluted, be employed. Dust off the picture carefully, then wash with lukewarm water, then make a stiff lather from shaving soap, which is applied over the whole painting in a thick layer. Allow this to remain for about ten minutes, then wash off the lather with a stiff brush, rinse with clean water and wipe with chamois skin. When thoroughly dry, dip a clean linen rag into nitro-benzol and go over the painting several times, always using a clean piece of the cloth for every new application, until the cloth remains clean. Then give the painting a thin coat of pure olive oil, and after a time a coat of good pale varnish.

— 19 —

Finishing Bowling Alleys.

While our experience in this line is rather limited, we know of several bowling alleys recently put up in the basements of club houses, the beds of which were made of hard maple 4 inches by $1\frac{1}{2}$ inches, laid in cement, edges up, the boards first oiled and firmly nailed together, the surface planed and smooth sandpapered. Then a coat of hot, boiled linseed oil was given, which, when well absorbed, was followed by an oil and wax finish, made by melting one pound of yellow beeswax and adding thereto one gallon boiled linseed oil and one quart spirits of turpentine, well rubbed in with a stiff floor brush and polished with soft felt and rotten stone. The side panels and other woodwork were finished in the usual manner in natural wood.

— 20 —

Preparing Canvas or Muslin for Photographers' Background.

Select close grained muslin and tack on to frame. Do not stretch too tight, as the muslin will shrink when sized. Apply one or two coats of a size made as follows: One pound ordinary gelatine is dissolved in two gallons of water, and to this one-quarter pound molasses and one-half pound bolted whiting is added, thoroughly stirred and strained through cheese cloth, while warm. When dry, smooth sandpaper, if necessary. The distemper color should be prepared as follows: Mix two pounds of bolted English cliffstone paris white in two quarts of cold water, making a fine, smooth paste; add to this a few ounces of ultramarine blue, ground in water, stirring it in thoroughly; then add a few ounces of lampblack, also ground in water (distemper color), or as much as is necessary to produce desired tint

(which can be tested by slow drying); then add one and a half ounces of good white glue, that has been previously dissolved in warm water, and strain the mass through straining muslin. If the distemper tint should set too quickly reduce the percentage of glue or add a trifle glucose syrup.

— 21 —

Painting Plastered Brick Walls.

It was required to paint a house that had been built twenty years, the exterior of which was veneered with brick and coated with lime plaster, making a mastic finish. It had been first washed with lime and water, then with lime and cement, neither of which gave satisfaction, because nearly all came off. To give advice it is necessary to know how solidly the plaster adheres and how heavy the coating is. If the plaster is still solid on the brick, the penetrating linseed oil would not loosen it, as brick is very absorbent, and if the oil penetrated deep enough it would act rather as a binder than a remover. It would be well to ask the owner's permission to let you try a patch with linseed oil in an out of the way corner. We have coated a similar surface to the one described with white lead and linseed oil paint, and have had the best of results. It was done two years ago on the north side of a building, and we first broomed all the loose wash off, then rinsed the wall with water, and before it was quite dry put on the priming coat. If the owner is obstinate and will not have any oil color used, and you do not care to lose the job, then try one of those washable distemper paints for outside work that are so largely advertised under various names, or prepare a wash on the following plan: Slake in a large barrel half a bushel of fresh burnt lime, cover while slaking to keep in the steam. When nearly cool, strain the liquid through a fine sieve and add seven pounds common salt, previously dissolved in hot water. Cook three pounds ground rice in water to a thin, creamy paste, and stir into the liquid while hot. Now mix half a pound of bolted paris white in water and add it also. One pound of pale blue is soaked in water over night, then boiled in the usual water bath and thinned with five gallons boiling hot water, all of which is added to the liquid in the barrel, which is allowed to stand well covered for a few days. This wash is applied as hot as possible, kept in a kettle on a portable furnace during the operation. It is weatherproof and washable and will stand many years. May be tinted with limeproof colors, such as ochre, ultramarine blue, drop black, etc.

— 22 —

Effect of Freezing on Fresh Oil Paint.

As linseed oil does not actually freeze unless the temperature is less than 18 deg. F. below zero, and as exterior house painting is not carried on in such frigid weather, there can be no actual injury to paint in freezing weather, excepting that the drying of the fresh paint is retarded. As a matter of course, another coat of paint should not be applied until the previous one is thoroughly dry, which, under the conditions named, may require weeks to become hard enough. A moderate use of turps will accelerate the drying

and hardening of the paint in Winter weather, and 75 per cent. boiled linseed oil and 25 per cent. turps is the proper proportion for the under coats, while for the finishing coat the turps should be cut down to from 10 to 15 per cent. Another safeguard is to hold the paint medium thin and brush it out to the utmost.

— 23 —

Turpentine in Linseed Oil Paints.

The painter can do a much neater job in exterior house painting by a moderate use of turpentine, because it will allow the paint to lie down closer to the surface and level itself more uniformly, producing a sort of linseed oil varnish effect. The painter must exercise his judgment, as conditions of surface and the state of the weather have considerable bearing upon the amount of turps that can safely be employed. When the lumber is soft and spongy no turps should be used in the priming coat, but for hard and close grained wood, raw linseed oil, four-fifths, and one-fifth of turps is better than all boiled oil. Our experience teaches us that for priming new work boiled oil is a failure, because boiled oil is really a varnish without gum or resin—that is, when properly boiled, otherwise it would be no good at all, anyway. Good kettle boiled linseed oil may safely be employed with anywhere from 5 to 10 per cent. of turpentine in finishing coats, and the binding properties or durability will not be injured by such portion of turpentine.

Chemical tests and experience have demonstrated that a paint film from good boiled oil and turpentine, 90 parts of the former to 10 parts of the latter, is less porous when dry than a paint film from linseed oil, raw or boiled, alone. It would be idle for us to give any set rules for the proper proportions of linseed oil, turps and driers, and we must leave this to the judgment of the painter, who will vary the proportions according to the nature of the pigment employed, and it stands to reason that burnt umber, for instance, does not require over one-fourth as much drier as lampblack or vandyke brown. In whatever paint a large portion of liquid driers are employed, turps must be omitted entirely or correspondingly reduced.

— 24 —

Preparation of Liquid Glue.

Two ounces borax are dissolved in one gill of boiling hot water, and while this is kept boiling, one ounce calcined potash is added; this solution is then stirred into a boiling solution of one pound animal glue and one quart of water. If too heavy, it may be thinned with hot water. Will not sour or mold.

— 25 —

Painting Exposed Plaster Figures.

Some stucco figures for the facade of a suburban house were given three coats hot boiled linseed oil before being placed in position. The stucco was perfectly dry and hard, but the oil came off in shreds, although the facade was not afterward painted.

To coat articles of plaster three times with hot boiled oil is rather barbarous treatment, and it is not surprising that the plaster figures rebel and shed their skin. If you have that kind of work again give only one coat of three parts oil and one part turpentine, and when this is well dried give another coat, but only one coat, of half-flat paint or color. You must remember, however, that there is no paint of any kind that will stand or wear for any great length of time on exposed plaster paris stucco.

— 26 —

Blistering of Paint on New Floors.

All the floors of a large new house were painted in November. The first and third story were leased out, but the second story was not occupied or heated. The floors of the tenanted rooms, three months later, were in good condition, while that of the unoccupied part was full of blisters and could be scraped off with a putty knife, although all the paint came out of the same package.

If the builder had given the whole house a good warming the blistering of the paint would not have taken place. In the first place the rapid putting up of new buildings, the false economy of not heating new houses thoroughly and uniformly and the poorly seasoned lumber employed all tend toward the same end. The tenanted portions are heated and the expelled moisture is confined to the unoccupied portions. Result: A swelling of the sashes, warping of doors. Wall paper and stucco become moldy, and in the paint on floors blisters containing water form. Moisture must find its way out somehow, and no sensible person can hold you responsible for the results mentioned.

— 27 —

Transparent Liquid Wood Filler.

Manufacturers of good wood fillers are not in the habit of publishing formulas that have been perfected after continued studies and experiment, aside from the cost of these. For this reason we cannot give any formula that we can vouch for, and would refer you to Grinnell's Hand Book on Painting, where the following recipe is given on page 135: Pale rosin, 2 pounds; boiled oil, 1 gallon; japan, 1 pint. Melt the rosin in the oil, take the kettle outside, add the japan and half gallon of turpentine; stir and when cold add one-half pound corn starch. Thin with turpentine until workable. Run through a paint mill or a fine strainer.

We would add to the above that in place of turpentine you may add benzine, but that, unless you are well posted and very careful, it may be dear to you at any price to experiment in that line, and that we should advise you to buy your filler from a manufacturer, which course may be much cheaper to you in the end.

— 28 —

Cheapening of Paint Material.

There are various ways of reducing the cost of paint, but it is a most difficult matter to reduce the cost to one-half, when linseed oil

costs 60 cents a gallon, and yet have a good wearing paint, as the lasting qualities of paint depend almost wholly upon the nature of the binder; and on that account we shall not advise the use of mineral or rosin oils. As dilutants or extenders (cheapeners) of paints, we have barytes, whiting, silica or silex, china clay or kaolin and gypsum. Of these barytes absorbs the smallest percentage, kaolin the largest portion of oil, while the other three are equal in that respect. Barytes is really the best extender for white lead paint, because chemically inert. Too large a portion of whiting for exterior work tends to flaking, while large portions of silica or silex make the paint too porous, and even small percentages of clay are liable to produce blooming, while gypsum is very transparent in oil. A paint made from pure white lead in oil at $6\frac{1}{2}$ cents per pound and raw linseed oil at 60 cents per gallon, or 8 cents per pound, in pure white, for finishing coat, will cost, exclusive of labor, \$1.24 per gallon, or 7 cents per pound. When made from 75 parts pure white lead in oil at $6\frac{1}{2}$ cents and 25 parts pure American zinc white in oil (to correct possible chalking), also at $6\frac{1}{2}$ cents, and linseed oil as above, it will require a little more oil for spreading and the cost, exclusive of labor, will be \$1.22 per gallon, or 7.1 cents per pound, this paint being a trifle lighter in gravity.

A paint made from white lead in oil, to which 40 per cent. dry barytes at $1\frac{1}{4}$ cents per pound and 10 per cent. dry bolted paris white at $\frac{3}{4}$ cents per pound is added, thinned with raw linseed oil at 60 cents per gallon and the necessary dryer, will cost, exclusive of labor, 75 cents per gallon, or 5.15 cents per pound. But this paint will not cover as well, when rubbed out, as the pure white lead and oil paint, therefore it must be used stouter.

— 29 —

Oak Graining Color That May be Rubbed.

To prepare oak graining color so that it may be rubbed it should be thinned with turpentine only and then some good rubbing varnish added, say one tablespoonful to one-half pint of the prepared color.

— 30 —

Cheap Black Dip for Stovepipe.

Take one part, by weight, of drop black in japan, break up with one part black japan, and thin with eight or more parts of turpentine. This will dry in one hour hard and when rubbed with a dry rag will have a soft polish. If this is too expensive, substitute benzine for turpentine, but in that case make up no more at any one time than what can be used that day.

— 31 —

Removing Grease Spots from Marble.

If the spots are fresh, rub over them with a piece of cloth that has been dipped into pulverized china clay, repeating the operation several times, and then brush with soap and water. When the spots are old brush with distilled water and finest French plaster energetically,

then bleach with chloride of lime that is put on a piece of white cloth. If the piece of marble be small enough to admit of doing so, soak it for a few hours in refined benzine.

— 32 —

Cheap Binder for Distemper Painting.

Dissolve in the usual manner one-half pound white sheet glue in one gallon of water, to which add one-half pound crystal alum previously dissolved in hot water and one-half pound white ivory soap that has been cut into thin strips and also dissolved in hot water. Mix all and boil until it becomes a thin, syruplike mass that is perfectly free from lumps.

— 33 —

Cement or Putty for Aquariums.

The simplest recipe that we know of is to mix fine litharge with refined glycerine to the consistency of soft putty. This becomes as hard as stone, and will not crumble.

Another good cement is made by mixing waterglass 33 deg. with zinc white or paris white.

— 34 —

How to Make Fireproof Paint.

Grind 7 pounds of zinc white and 3 pounds of air-slaked lime in one quart of fat linseed oil, then add one quart of waterglass of 33 deg., and stir into the mixture 5 pounds dry white lead and 1 pound sulphate of zinc. Thin with soft water to proper consistency and use immediately.

— 35 —

Crawling of Graining Colors in Distemper.

The creeping or crawling may be caused by the ground being too oily or too hard; also, to very cold atmosphere. If the addition of old ale or beer does not stop the creeping a moderate portion of beef gall with a few drops of spirits of hartshorn, onion juice and syrup of aloes may prevent it, when added to the color and well mixed in. Sometimes the addition of a little lime water will prevent creeping. When all of these fail, especially on old, hard ground, use spirits of hartshorn or caustic soda lye in very minute portions with the color and there will be no creeping. We would, however, caution against the use of beef gall when the ground is not thoroughly dry and hard, because in that case the graining is very apt to crack immediately after the varnish becomes dry.

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Easy Method of Frosting Glass.

Dissolve Rochelle salts in gum arabic water and let it stand about 12 hours. Clean the glass to be frosted well and lay it down flat, if convenient, and flow on the solution, so that it will not run. When

about to set take a pointed stick and dot it in rows about an inch or so apart. The solution may be colored with aniline dyes if desirable, and when dry flow on a thin coat of damar varnish.

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Cleaning Painted Surfaces.

An excellent thing to advise as being most effective and least injurious to the paint, is soft water, good soap, soft brushes and cloth for doors, sills, etc., and water with a trifle of aqua ammonia for floors. Never suggest anything stronger, especially where you do the painting. Many housewives or their servants have a mania for cleaning, that goes to extremes in the selection of mediums. Soft soap containing strong alkalies, soap powders, overdoses of ammonia, the use of sand soap, or even fine sand, coarse, hard scrubbing brushes and coarse wiping cloth are used with an energy worthy of a better cause, and then they wonder why paint does not stand or wear on floors and on doors, window frames and sash. The moderate use of soap or dilute ammonia, which is generally rinsed off again in short order, does no harm to the paint. It is the mechanical friction of the brush, the coarseness of the cloth and the strong alkaline nature of the soap powders which does the harm.

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Cheap Medium for Polishing Floors.

Dissolve one-half pound commercial potash in two gallons rain water or soft water, then put one pound of yellow country beeswax into a pot, place the pot over a slow fire and melt the wax with one pint of the potash solution. When the wax and water have united add the balance of the solution and heat, while continually stirring. When the mass appears like curdled milk take from the fire, and now more water can be added without fear of separation. May be applied to floors with cloth or brush, but must be warmed up before using and well rubbed in to produce the wax finish.

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Treating Kalsomined Walls for Papering.

If the kalsomine is in good condition, hard and sound, an ordinary glue size is all that is needed; give the walls a good coating and proceed. If the kalsomine is old, disposed to crack or crumble, or, in other words, if it is not absolutely sound and in excellent condition, the thing to do, if you can't take it off, is to give the walls a soaking coat of good, strong size; further than that, be sure that the rooms and the walls are warm; warm enough so that the size can and will strike clear through kalsomine and attach to the solid wall itself. That will make you safe. If, on the other hand, the walls are cold, they will chill the size before it gets into the wall and cause it to jell. Then when your paper goes on it looks very well at first, but soon the paper, size and part of the kalsomine come off, and stretch themselves out upon the floor, as provokingly as gnats in varnish. Another point that should

always be kept in mind is that this size should never be put on in any other condition than hot, or good and warm.

Your paste will likely hold better if you add a little Venice turpentine to each bucketful, say about an ounce of it dissolved in a little hot water, and then well stirred into the paste.

The very best and safest way to paper over kalsomine is to take the kalsomine off the walls first; it is the only way to do it and do it well, but we know that many times a man is not allowed to remove the kalsomine, when the price paid is considered.

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Impregnation of Wood with Cement.

This coating is used only on rough, unplanned timber, and only enough is prepared at one time that can be applied in thirty minutes. The mixture is made as follows: Ten pounds Portland cement, 20 pounds fine, floated sand; 10 pounds fresh cottage cheese and one gallon buttermilk are intimately mixed, and it must be continually stirred during application. Must not be laid on too stout, and as soon as first coat is dry a second coat should be given. Over this coating a good green color, ground in oil and thinned with boiled oil and a portion of varnish, may be applied, and it is asserted that wood so protected will positively resist all influences of atmospheric changes and conditions and be fairly fire resisting.

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Removing Mold from Wall Paper.

A building papered in the fall and unoccupied during the winter showed mold on the wall paper in the first story, after it had been occupied in the spring.

The trouble appears to be due to dampness in the walls and the cold atmosphere. Dissolve one part of salicylic acid in four parts 95 per cent. alcohol and apply the solution by means of a soft sponge to the mold spots and you will find that they disappear immediately. To prevent further formation of mold the room should be well heated and ventilated; or if this is impossible, then give the whole surface a light wash of this solution by daubing.

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Killing Knots in Outdoor Work.

In this country shellac varnish is generally employed for the purpose, and sometimes red lead is mixed with the shellac varnish. Thin glue size and red lead are also used, but wherever the sun has a good opportunity to get its work in the knots will show through and discolor tints in short season. The very best method is to apply oil size to the knots and lay the leaf of silver or aluminum metal over it. Unless the knot be very pitchy or sappy this will prevent exudation.

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To Avoid Varnish Cracking in Graining.

The cracking of the varnish on outside grained doors may be due to inelastic varnish or to a ground that is too oily, or to the varnish being applied before the ground work and graining color is dry. Have your ground thoroughly dry, and do not hold your graining color too oily and give it ample time to harden before varnishing; then finish with a good elastic outdoor varnish and cracking will not occur, if the lumber be fairly well seasoned.

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Use of Boiled Oil.

We do not especially advocate the use of boiled oil, but do believe that for slow drying pigments it is far better to use a pure kettle-boiled linseed oil than to use raw oil and dose it heavily with cheap Japan driers. It is a serious error to lay the reason for paint blistering to boiled oil, because blistering is invariably brought home to moisture, and in kettle-boiled oil all moisture has been expelled. Of course the so-called bung-hole boiled oil (a mixture of raw oil and cheap drier) may contain large portions of water. Gold size, which is really boiled oil, heavily charged with red lead and litharge, should not be added to oil colors that are good driers in themselves.

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Paint for Iron Veranda Roofs.

Dissolve two ounces of chloride of copper, two ounces nitrate of copper and two ounces sal ammoniac in one gallon of water; then add two fluid ounces of crude hydrochloric acid. This solution must be made in stone or earthenware to prevent precipitation of the copper salts. Cover the surface of the galvanized iron with this solution and it will assume a black color, which on drying over night will turn light gray and upon which a red lead priming, thinned with equal parts of raw linseed oil and turpentine, will hold like grim death. Subsequent coats can be given in colors rich in oil, etc. Galvanized iron should at no time be first coated with an all oil paint.

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Greens for Distemper Painting.

The Brunswick green in distemper, which is acted on by alum, or caustic lime, is not the Brunswick green of years ago, which was a basic chloride of copper, now quite obsolete. It is known in the United States as commercial chrome green, a mixture of Prussian blue and chrome yellow on a mineral base, mostly barytes, usually 20 to 25 per cent. color, balance barytes. These greens hold their color very well as an oil paint, but as a water color are very easily attacked by lime and other caustics. Sometimes the blue will change first, but mostly the yellow turns to orange and gives a decidedly smutty olive cast to the color. We should advise for use in distemper painting, when the price paid for the work will permit the

advance in cost, such as verdigris and emerald green, or, if their poisonous character prevents their use, green verditer, Bremen green, cobalt green and terra verte (or Verona green), all of which are lime or alkali proof.

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Fire Checks in Varnish.

If the checks are not too prominent, we should advise one or two coats of good rubbing varnish, which will conceal all of this very objectionable feature.

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Preventing Bronze from Tarnishing.

Any bronze stripe, letter, etc., may be kept from tarnishing by coating it over with a thin coat of white shellac varnish, before it is coated with finishing varnish.

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To Remove Very Hard Old Putty.

Brush the putty over with muriatic acid, and, if necessary, repeat the operation several times; then remove with putty knife in the usual way.

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Sizing Muslin for Lettering.

For ordinary signs, not exposed to the weather, use a thin size of glue and water. For outdoor purposes melt two ounces of white beeswax, and after removing it from fire, thin with one quart of turpentine. Apply with a brush while warm.

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Filling in Letters on Metal Signs.

If black, make a putty-like mass of asphaltum, brown japan and dry lampblack and fill the spaces. Clean the edges with turpentine and when the cement is dry polish the sign. For white letters make a putty of dry white lead with equal parts of coach japan and rubbing varnish and fill up the letters to nearly the level of the surface. When this is hard, apply a stout coat of flake white in japan, thinned with turps, which will give a clean white finish and may be polished. This may be tinted to any desired shade. In any case, the cavities of the letters must be thoroughly cleaned before filling in to insure adhesion of the

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Crawling of Hard Drying Interior Varnish.

Crawling of varnish may be due to various causes. Your first coat may not be hard enough to admit of the application of the second coat, and so on. The varnish may sweat out or the rooms may be too cold to permit the varnish to flow out and lie down evenly. In any case, the most effective way to prevent crawling of second and

succeeding coats is to see that previous coats are perfectly hard and to "moss" or "hair" them down. Often a simple rubbing with a moistened chamois will prove sufficient to prevent crawling.

Your varnishes may be too heavy bodied for first coating, and in that case you should ask the advice of the makers as to the proper method of cutting the material.

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Light Color for Oak Furniture.

If oak furniture is to remain light, and especially the parts are not to set off dirty, proceed as follows: Take good wheat starch, press it fine with the hammer, stir strong yellow polish of good quality with the wheat starch into a thick paste and work it with a spatula into the pores, by passing crossways over the wood, allowing it to dry for one-half hour. Then go over the wood thus saturated with a scraper, so that only the pores remain filled. If there are open pores left proceed as before. If the wood is to be polished, rub it down with pumice stone and oil and then polish; if it is to remain dull, it may be coated with white wax and oil of turpentine and rubbed diligently. Turpentine, oil and wax applied on oak wood without previously filling up the pores does not remain clean and light for a long time. The pores saturated with wax become dirty in a short time because the wax does not become so firm as starch and polish.

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Painting on Ground Glass.

Rub over the ground side of the glass with equal parts of oil and turpentine, then dip some cotton into turpentine or benzine and remove therewith the oil and dry the glass well. Now dust some fine starch on the surface and brush it off with a duster. This removes the dust produced by the grinding of the glass entirely and bleeding out of the colors need not be feared. Do not draw your sketch with lead pencil, because that will always show on the reverse, but use black crayon, because this will be absorbed into the colors. Select tube colors only for this purpose, and to make them flow properly add a little fat varnish and thin with turpentine for first and second coats. The larger paintings should have three or four coats, and should be stippled after every application. Should any part of the painting dry out flat, coat it with a good, pale coach varnish. Painting done by this method will prove very durable.

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Iron Rusting Through White Lead.

1. One coat of lead is insufficient to stop rust from coming through, when once formed, even if invisible to the naked eye before painting. Such rust will grow under any oil paint, and will come through sooner or later, especially early, when there is only one coat of paint.
2. It is well known that linseed oil has a certain degree of porosity, and that it does not stop ingress of moisture; therefore one coat of oil

paint will not prevent the rusting of the iron, even if rust has not been already present before painting.

3. So long as a special brand of white lead was the only white lead applied on some particular surface, it cannot be determined whether other brands would not have shown the same fault.

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Making Use of Paint Skins for Roof Paint.

We do not know of any better method to make use of paint skins than to soften them by boiling with plenty of linseed oil or linseed oil foots, running the softened skins through a paint mill or a paint strainer, and we believe such paint to be cheap, even at a high cost of linseed oil. We do not advocate the use of substitutes or inferior oils, nor would we recommend the boiling of paint skins with anything but linseed oil, but if the paint must be cheap and if low cost is paramount to durability, there are mineral oils and rosin oils offered to the trade, which may be employed for thinning the boiled skins to painting consistency and the material cheapened by these means. Many dissolve the paint skins accumulating about their workshops in a solution of 2 lbs. concentrated lye, 5 lbs. unslacked lime and 15 gallons of water. The skins are occasionally stirred and when dissolved the lyewater is poured off from the top and the paint in bottom of tank or barrel may be used, after thinning, for priming rough work, but is hardly fitted for coating tin roofs or ironwork.

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To Fix Bronze Colors on Glass.

The late Prof. R. Bottger, of Frankfort-on-the-Main, employed a process for fixing bronze colors on glass, etc., which consists in using differently colored fine bronze powder, together with a concentrated potash water glass solution of 30 degs. B. After the articles to be bronzed have been very thinly and uniformly coated with the water glass solution by the use of a fine brush the bronze powder is strewn on by means of a sort of sieve. Allow same to dry perfectly with ordinary heating, and remove with a broad, fine brush the superfluous bronze powder, which has not been taken up by the potash water glass. The water glass effects such an intimate combination and adhesion of the bronze powder layer to the object, that even alcohol, sulphuric ether or water are not capable of removing the same. Such articles may even be polished with a burnisher or agate. Glass as well as porcelain, metals of every description; wood, such as mirror and picture frames, etc., can be decorated in this manner and the covering may be washed off without injury.

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Varnish Becoming Chilled in Cold Weather.

When varnish has become chilled, it will show a soiled or sandy surface. When varnish or japan is received in freezing weather, it should be placed and left undisturbed for a few days in a very warm place (at least 75 degs. F.) before an attempt to use it is made, and if stored in

a room with a temperature lower than 70 degs. F., it should be placed in a place that is warmer than 75 degs. F. for a few hours. A thermometer in a room may register from 65 to 70 degs. F., yet if this thermometer was placed close to the floor it might register 10 degs. less.

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Simple Tests for Linseed Oil.

To test for purity, procure nitric acid of 1.40 specific gravity, and use no other for testing various samples of oil at the same time. Use glass testing tubes or two-ounce long vials of clear glass, and put into the tube equal parts of the oil to be tested and nitric acid, shaking it well for one-half of a minute, then set aside for about 15 or 20 minutes to settle. As rosin oils and mineral-oils are about the only adulterations to be looked for at the present day, the following will be a guide: The nitric acid and oil will separate in the tube or bottle, the oil floating on top. There will be two layers or strata, and when the oil is pure raw linseed oil the upper stratum will be straw color, the lower stratum nearly colorless. If rosin oil be present in small percentage the upper stratum will be brown, the lower one decided straw color; when there is more rosin oil, say from 20 to 30 per cent., the upper stratum will be brownish black, the lower stratum deep straw color. If fish oil be present, the upper stratum will be thick brownish black mass, the lower dark orange. For the presence of mineral oil the nitric acid test need not be applied, as the presence of mineral oil is revealed by a bloom or iridescence, that may be plainly noticed. If the painter is of an inquiring turn of mind and has the facilities, he may apply the flash test by heating the oil to a certain degree and then igniting the same. Pure linseed oil will not flash below 480 deg. F.; rosin oil will flash at 320 deg. F., and mineral oil at from 390 to 400 deg. F. But the simplest and generally the most effective way to test raw linseed oil is for the painter to familiarize himself with the appearance of rosin, mineral and fish oil, as well as with their odor. If he has any oil to sample that he suspects, let him put a few drops of the oil between the palms of his hands, rubbing them briskly together, and depend on his sense of smell. If there is any, even a very small portion, of the oils mentioned present, he will be sure to detect it.

It will be very difficult to find at present any cold pressed oil, as nearly, if not quite all, the oil that is not made by extraction or percolation, is hot pressed. Cold pressed oil is of better odor and body and generally greener in color than the hot pressed oil, and this in turn is of better odor and body and not as dark in color as the extracted or percolated oil. In the nitric acid test, the cold pressed oil will give the palest color in the upper stratum, a very light straw; hot pressed a straw color, and percolated oil gives a straw color with a reddish tinge. It is, however, a most difficult matter to decide between a well settled hot pressed oil and a newly made cold pressed oil, but there is scarcely any difficulty in determining which is pressed oil and which extracted oil. The latter is of lighter specific gravity, and if both are weighed at even temperatures in a standard measure on a delicate scale, the difference will be sufficiently marked. As in all things, impartiality, accuracy and some little experience is required.

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Preparation for Damp Walls.

We will give a few hints for the treatment of damp walls, obtained from reliable sources.

Make a glue size by dissolving one pound of good white, sheet glue in one gallon of soft water, soaking the glue first in cold water and then boiling it in a water bath. Keep this glue size in hot water, stir in enough red lead to make a stout, but workable paint, and apply while hot. When the dampness comes from the outside of a wall, the moisture should be driven out by heating, the defects remedied by a plasterer or mason, when the wall is of brick or stone, or when of wood, battening and canvassing should be resorted to; the battens to be nailed up and down, a reasonable distance, say 16 to 20 inches, apart, the canvas cut to the size of the wall space and stitched neatly together, then stretched and tacked on to the battens, after which a glue and alum size is given, preparatory to the application of oil paint.

Coating damp walls with tinfoil or sheet lead will prevent moisture from coming through the paint for a while, but does not effect a permanent cure.

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Paint that Will Not Peel Off.

Peeling or scaling of paint is usually due to the use of improper material for priming, and no subsequent attempt at remedying the evil will be successful, unless the proper priming is applied, after all the loose scales have been removed. Paints consisting of pigments of a brittle nature and inferior oil must be carefully avoided and the priming must consist of a pigment and vehicle that have great affinity for one another. No matter what subsequent coats may consist of, the priming coat should be pure white lead and raw linseed oil. In repainting such a job proceed in the following manner: First, scrape off all the paint, loose or otherwise, and if impossible to remove all by scraping, but the obstinate part off in the usual way, then give a thin priming, using not over eight pounds of strictly pure white lead to one gallon of pure raw linseed oil, and about one-fourth pint of good liquid drier. If convenient, tint this primer with a little lampblack and work the priming well into the wood. Allow this priming to dry thoroughly for a week, if possible, then give a heavier coat of white lead, oil and drier, tinted to match finish desired, and when this has dried well, finish with whatever paint is required. Two coats over such priming should always be given. This method may be more expensive than those usually followed, but good results can be vouchsafed.

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Painting Plastered Walls.

In Government work contractors are generally held down strictly to specifications, which fact should not be lost sight of. It would be cheaper to give one coat of glue size and two coats of oil paint to the walls, but glue size direct to the plaster is unsafe on account of possible

dampness, and if three coats of paint are specified, glue size will not be permitted to figure as a coat of paint. For good work on walls of hard plaster, a thin priming of white lead, thinned with raw oil and a small portion of turps, is recommended, on which a coat of glue size is applied to stop suction for succeeding coats, of which there should be not less than two.

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Testing the Binding Properties of Glue.

Good animal glue, when soaked in cold water, should swell considerably, should not discolor the water to any great extent, nor should it give off much soluble matter to cold water, and, above all, it should not give off a disagreeable, sour or moldy odor.

Even when digested for twenty-four or forty-eight hours in cold water it must not become liquid enough to flow, but when heated at a temperature of 120 deg. F. it should dissolve and be thoroughly dissolved at 125 deg. F.

To test its binding properties there are various methods, but we shall give only the simplest one. One part by weight of glue, say 1 lb., and 2 parts by weight of water, say 1 quart, are heated in a glue pot on a steam bath, until the weight of the original mixture is reduced to 1 $\frac{3}{4}$ lbs. This is then tested in the following manner: Hard or soft wood, 1 inch in thickness and 16 inches long, are cut in half, so that each piece is 8 inches long, and these pieces are glued together again at the point of separation and laid away for three days in a fairly warm place. On one of the pieces, 1 inch from the end, an eye bolt is inserted, to which afterward weights are attached and the pieces of wood fastened to a table, so that the joint is just flush with its edge; then the weights are attached to the eye bolt, and the joint should stand a weight of at least 150 lbs. before breaking if the glue is to be considered first class. The test should be begun with 50 lbs., and the weight increased 10 lbs. every minute, until breakage occurs. This, of course, is a test for joiners' glue, and if merely for painters' purposes we should say that the glue which takes up the most water in proportion is the best to select.

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Treatment of Exposed Walls for Efflorescence.

In an apartment house in New York City, the wall of the elevator shaft projects some 12 feet above the roof, having a northern exposure. The inside of the shaft, which has a plaster finish, had been painted. This paint cracked and crumbled off, and in scraping away the loose paint it would all fall away. The painter thought this was due to saltpeter. To cure it he put in new plaster mixed with water glass, and coated this again with water glass, shellac and paint, but the trouble broke out again a week or so later. He then puttied up all the joints on the outside of the wall and gave it a stout coat of graphite paint, but this also peeled off in places that corresponded with those on the inside.

This case is an old evil and may be traced to moisture and to soluble salts in the cement or mortar, and incidentally to inferior brick. The term "saltpeter" used in connection with efflorescence on brick walls is erroneous, the salts which are present in cement and mortar are dissolved by the water with which these binders are mixed, and as the water evaporates in drying, it carries the salts to the surface in crystalline form. In the case cited it would appear that the inside of the shaft was plastered and probably painted soon after, before the wall had ample time to dry out thoroughly. If such was the case, it is not surprising that the paint would not stay on the inside, because on a northern exposure the moisture could not be drawn out by the sun, consequently it remained there, and neither the inside paint could remain firm nor the graphite paint applied to the outside. The painter was in no way to blame for the failure, as it is no doubt due to the ignorance or carelessness of those who did the work originally. Plastered walls should not be painted unless they are thoroughly hard, and if the plaster contains much lime they should be allowed to stand quite a long time, or the lime salts should be neutralized by a wash preparatory to painting. While there is no really effective remedy known to the trade or to science, excepting the thorough expulsion of moisture from the walls by heat, unless there is an opportunity for a wall to give up its moisture from the unplastered or unpainted side (which it would scarcely do when that side is exposed to the north), we would recommend repeated washings on both sides of the wall with phosphate of lime or phosphoric acid preferably, or with commercial sulphuric acid. Nitric acids and other acids, which form soluble salts with lime, must be avoided as washes in this connection. This treatment will neutralize the salts, which are detrimental to oil paint, and allow the coating to remain firm, unless an extraordinary amount of moisture will force its way through from the other side. The first coat of oil paint applied over the wash when this has had ample time to act on the mortar or plaster and become dry, should be a stout all oil paint, with only the necessary drier added, and well rubbed out. When the weather is favorable and the wall reasonably dry, the outside should be given a few good coats of good linseed oil paint to keep moisture from striking in.

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Cheap Coal Tar and Mineral Paint, Etc.

A painter wants to know how to make a cheap black paint from coal tar, and a cheap ready mixed paint from iron oxides for covering iron and tin roofs, which should be practically an anti-rust paint.

If you want something cheap, you cannot expect wear or durability, nor can you expect to give the metal protection against rust. It has been demonstrated that coal tar, though apparently preserving iron, when repeatedly applied, does not stop or prevent corrosion, but that it rather aids in the gradual destruction and weakening of the metal, unless it is thoroughly refined and mixed with good asphaltum and linseed oil, and combined with drying mediums in the varnish kettle and thinned with good solvent, such as benzol, spirits of turpentine

or benzine. Coal tar, simply thinned with benzine, becomes too brittle after drying to withstand the action of the elements for any length of time. Here is a formula for a black that has given good satisfaction for wear: Take 30 pounds each of coal tar pitch and cheap asphaltum, melt and boil over a slow fire for 5 hours; then add 8 gallons boiled linseed oil, and slowly 10 pounds each red lead and litharge; boil 3 hours longer, then take from fire and thin while still warm with enough turpentine or benzine to make it work freely. If this be too troublesome or too high for cost, take 3 gallons liquid coal tar and mix with it 1 gallon benzine asphaltum varnish, which may be thinned with either turpentine or benzine to working consistency.

We would suggest, however, that you buy your material ready for use from manufacturers, who make a specialty of supplying such paints, as it may save you money in the long run, not to speak of the risk you run in preparing these goods yourself.

As for cheap oxide of iron paints for roofs, if you have no mill, we should advise you to buy your red or brown, already ground in oil, and thin it with good old-fashioned kettle boiled linseed oil or raw oil and liquid drier. If you value your reputation as a painter, you will not resort to the use of mineral or rosin oils, and if you desire to make an anti-rust paint you will use good Venetian red or metallic brown for tin roofs, and prime with red lead for iron. When color is no object it might pay you to try graphite paint.

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Painting a Hearse in White.

As hearses are subject to exposure and wear same as other vehicles, though not to such an extended degree, the use of zinc white and damar varnish, which furnish the cleanest white, cannot be taken into consideration and we must look to white which will give the next best result as regards whiteness and which will insure durability at the same time. These are the quick-drying whites, known variously as Cremnitz white, flake white or Florence white, and are usually ground in very pale drying vehicles and are ready for application when thinned with good, pure turpentine.

But it is not only necessary to select the best of these, but to proceed with the utmost care from the very foundation up to exclude any excess of oil, which may discolor subsequent coats of clear white.

To make a first class job in painting a hearse or any other vehicle in white, if the object is entirely new, dust off the wood and remove any discoloration that may be apparent. Then give a coat of pure raw linseed oil, which may be warmed, in case its temperature is less than 75 deg. F. Brush this in well and see that every part of the wood is covered. This should be allowed at least 5 days before another coat is given and then well sandpapered. Now a coat of white lead in oil, thinned with one-quarter raw oil and three-quarters part turps, to which a little pale coach japan is added, may be applied and, this coat dry, the necessary puttying or glazing should be done. Use for putty a mixture of dry white lead and equal parts of rubbing varnish and pale coach or gold sized japan. For the deeper places it must be rather stiff, otherwise it may be pastelike, and for glazing, thin with turps.

After removing uneven places with sandpaper, give a second coat of white lead, thinned with a trifle of oil only, say one-eighth raw oil and seven-eighths turps, adding a tablespoonful of pale coach japan to one-half gallon of the thinned lead paint. Then sandpaper again lightly, and apply two coats of any of the quick-drying whites above referred to, using a soft bristle brush and working the white in such a way that brush marks are avoided. It is well to add a trifle pale finishing varnish as additional binder, especially for the second coat. Over this apply a full, flowing coat of the palest rubbing varnish, to which has been added a trifle of the quick-drying white to take off the yellow cast of the varnish. When thoroughly dry, rub with pumice and water, clean off carefully, then apply a coat of flattening varnish, also colored with some of the white. Moss or hair carefully when dry, and clean up thoroughly, then apply a final coat of palest finishing varnish that can be obtained.

There are other methods of finishing vehicles in white, but we believe this to be the most durable for the short time required and the most economical.

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Method of Finishing Hard Wood Floors.

There are various ways of treating hard wood floors and the method adopted depends on the taste of the owner and the price paid for the work. The most usual and cheapest method is to oil the floor, after it has been thoroughly cleaned of plaster spots and other marks of discoloration, dust, etc.; the oil should be kettle boiled, or if this cannot be had, good pure raw linseed oil, with one pint of good japan, to seven pints of the oil and well brushed in. This dry, put on paste wood filler of a color suited to the wood and thinned with turps, the surplus of which is to be removed as usual, when about to set. When the filler has become hard and dry, carefully sandpaper, putty up with hard drying material to match color of wood, then dust off and give a coat of shellac, which may be rubbed with flour of pumice and oil to present a dull finish, or may be waxed with wax floor polish.

If it is desirable to change the color of the wood, transparent, or semi-transparent colors, such as raw or burnt sienna, raw or burnt umber, vandyke brown or rosepink or any mixture of these may be added to the oil for the priming and the wood filler selected to match. In place of the shellac a good, hard floor varnish, that will rub well, may be substituted. If undesirable to use varnish, the floor may be oiled or stained and filled and wax floor polish paste applied directly without an intervening coat of varnish and polished with a large, heavy floor brush, the finish depending on the amount of elbow grease expended.

For extra fine work and where price permits, the oiling and filling is proceeded with in similar manner, but the finishing is done by giving in succession several coats of shellac varnish or hard-drying floor varnish, each of these being rubbed with pumice and water or pumice and oil, until an even mirror-like surface is obtained and the final coat of varnish simply "mossed" to take off the very high lustre, and then usually waxed.

The foregoing is the method used for finishing hard wood floors, which are expected to be subjected to extraordinary wear, such as the floors of offices, hospitals, public halls and libraries, etc. The prevailing practice for floors in private residences, where they are covered with rugs or carpets for at least part of the year, is more simple. They are not oiled, but the hard wood filler is applied directly to the finished wood, wiped off, allowed about 24 hours to dry, sandpapered and either shellac varnished or waxed directly on the filler. While not as lasting as the other method, it wears fairly well and makes a good finish that does not scratch or spot as readily as varnished floors, and it is much more economical.

— 68 —

How Should Copper Work Be Treated to Get the Best Results for Painting the Same to Resist the Discoloration by Verdigris?

Copper, like bronze, when exposed to the influence of the atmosphere, becomes oxidized on the surface and this film or incrustation so formed, which is known by the technical term patina, will resist further oxidation and upon it any good oil paint will gain a firm hold, unless there be grease or dust deposit present. These should be removed by brushing or washing before painting.

Verdigris, so isolated, will have no ill effect on oil paint, but if copper must be painted, before patina has formed, it should be well cleansed and a thin coat of shellac varnish applied before beginning to paint. This is the proper method to be followed on small articles of copper that are not to be exposed.

Where the green verdigris has formed, instead of the brown oxide of copper, remove it with a rag saturated with a weak solution of ammonia and rub dry, then apply a thin coat of shellac varnish.

— 69 —

What Is the Cause of Linseed Oil Applied on the Outside Losing Its Gloss, Say Within Sixty Days?

A large book could be written on this subject alone, and limit of space allows us to mention only very few of the causes that make linseed oil lose its gloss more rapidly than it should. Chief among them is the inveterate use of liquid or lightning driers or japans and turpentine. Next comes the practice of giving only two coats, where three are required. The too rapid application of the final coat upon the preceding one may also account for the deadening of the gloss.

The use of earthy pigments in old paints causes much of this trouble, but through no particular fault of theirs, rather, because their requirements for a liberal allowance of good, heavy bodied oil are not always understood.

When the undercoats are too oily or not dry enough, the next coat of oil paint is liable to sink in or deaden. The same will happen when oil paint is applied to wet surface. Good, heavy-bodied raw linseed oil, to which a moderate quantity of good japan drier is added, or good kettle boiled linseed oil, when judiciously used with the desired oil

colors or white lead or both, combined on final coat on good hard ground work, will not lose its gloss under ordinary conditions in 60 days, nor in a year. Of course, there are conditions where linseed oil will not stand, such as sulphur-laden atmospheres or where ammonia vapors abound.

— 70 —

Putty for Parquet Floors.

An excellent putty for floors consists of a thorough mixture of paper, preferably blotting paper, which has been soaked in boiling hot water until pulp is formed, which is then mixed with glue, also dissolved in water. To this bolted whiting is added in sufficient quantity to make a fairly stiff putty by kneading the mass, which is pressed into the cracks and smoothed off with the spatula or putty knife. However, this putty is recommended for large cracks only, because unshrinkable, but is scarcely adapted for shallow cracks in a parquet floor. For this purpose we would recommend one part white lead in oil, mixed with two or three parts of bolted whiting and enough coach varnish to make a stiff paste. If the work must be hastened, coach japan may be substituted for part of the coach varnish. This putty will resist moisture, and when dry and hard may be sandpapered or rubbed, and it may be tinted with color if required to match the color of the wood.

— 71 —

Backing for Gilding on Glass.

The best backing for gilding on glass when the same is to be shaded is dry lampblack mixed with quick-drying rubbing varnish and thinned with enough spirits of turpentine to make the material work evenly and freely. Or drop black ground in japan, thinned with turpentine to which a moderate portion of quick-drying varnish has been added, will serve the purpose also very well. Either of these will not soften under the shading color, and can be made to dry hard in less than 12 hours, but will not increase the burnish of the gold.

That is an entirely different matter, and depends on the condition of the size used in laying the leaf and on the subsequent treatment in burnishing. Some authorities recommend the use of gum arabic size, one drachm to one pint of boiling water, which is to be filtered through blotting paper, and to which, when cold, one teaspoonful of white whisky is added. Kept in a bottle well corked, it will keep for a year. The most favored size, however, consists of isinglass, of which a piece the size of a nickel is dissolved in a pint of rain water, boiling hot. This solution is filtered through filtering or blotting paper, and when cold a tablespoonful of whisky or alcohol added.

If the use of asphaltum for backing the gold leaf is avoided and japan color, thinned with rubbing varnish, used, the gold will retain its burnish, because such colors will not strike in, as may be the case with asphaltum.

— 72 —

Paint Peeling and Blistering in Hothouses.

Considerable trouble was experienced because of paint peeling and blistering on the cypress framework of a hothouse. The wood was thoroughly seasoned, primed with best French ocher, thinned with good raw linseed oil and a little japan. The priming was allowed to stand a week and was then given two coats pure white lead in oil thinned with raw oil and a trifle of japan only.

Cypress being close grained, ocher, no matter how finely ground it may be, is not the proper material for priming, because it produces a film that does not adhere well, excepting on very spongy and open-grained wood. The oil penetrates into the wood to a certain extent and leaves the brittle pigment on the surface without sufficient binder.

It is a noted fact that on many houses primed with ocher and finished with tinted lead, where paint has scaled, there was a so-called splitting of the priming coat, the priming apparently still remaining on the wood, while on the back of the scales the color of ocher is also plainly noticeable. That pure white lead tempers the brittleness of ocher is an established fact, and if ocher is desirable in a primer it should be mixed with white lead in equal bulk.

However, for the inside of hothouses that are constructed of cypress or similar timber, pure white lead only is recommended for priming, and such priming should not be all oil, but should contain a trifle of turpentine also in order to make the paint lie down close, nor should subsequent coats of paint be too oily, and be well brushed out; ample time for drying should also be given between coats. The cause for blistering may have been somewhat due to green wood, but we rather think it was caused by moisture and heat, the water condensing on the paint being absorbed by the pores in the latter and settling under the priming coat, naturally formed blisters and in some places threw off the paint.

— 73 —

To Paint Zinc Lined Bathtubs Successfully.

To make a good and durable job, the paint should be baked, but if this is out of the question, it must be air dried. After cleaning the zinc surface from grease, etc., wash thoroughly with dilute muriatic acid and rinse well with clear water. Dry the surface and give a coat of zinc white in oil, thinned with two-thirds oil and one-third turpentine, and a trifle of japan. Allow this to dry hard, then apply the flat color and varnish or give the required number of coats of so-called enamel. It is self-evident that only the very best material will give satisfactory wear.

— 74 —

Effect of the Vapors in Stables on Oil Paint.

The inside of a stable having rough plastered walls and brick arched ceiling was painted in the fall with oil paint. But during the winter the ceiling dripped with moisture and the coachman attempted to wash

it with soap and water, when the paint came off like whitewash.

It is well known that ammonia vapors form in stables, and that during the winter especially, when there is little airing of such places, the ammonia vapors are bound to seek an escape somewhere, and naturally an arched ceiling will be first attacked. The paint becomes saponified and runs, and the least friction, as in this case, by washing, will remove it completely. This has been recognized for quite a time, and the general practice is to have stables finished in hard wood, with a good varnish coating, which, after all, resists ammonia vapors better than oil paint. The painter cannot be blamed for the perishing of the paint, because he cannot estimate in advance the possible degree of deteriorating influences from this source.

— 75 —

The Blackening of Gold Bronze on Exposure.

The spikes of an iron railing were painted with gold bronze, which turned black in less than four months. The bronzing liquid that was bought by the painter became thick, and was thinned with turps.

While an inferior bronzing liquid may have a bad effect on the bronze when the powder is mixed with the liquid and kept for any length of time, it cannot be due to the quality of the liquid in this case. There is gold bronze on the market that will not tarnish on exposure to the elements, but such is really more expensive than gold leaf. The bronze sold for general use consists of alloys of copper and zinc or tin, and will be bright only so long as a spigot or other article of brass or copper on exposure to air. When such bronze is mixed with the liquid and so applied, it will be bright until the atmospheric influences destroy the vehicle. Often, however, the acids in the varnish or bronzing liquid attack the bronze itself and turn the bronze green, if not black. Where durability is desired, gold leaf should be used.

— 76 —

Painting with Oil Paint on Muslin or Canvas That Is to Be Rolled Up Frequently and Exposed to the Weather.

Dissolve white beeswax, which is finely sliced, in spirits of turpentine in the cold way, which requires about three days. The mass must have the consistency of soft soap. Now add three-quarter pound of this to two pounds of zinc white, ground in oil, and two tablespoonfuls of soft soap. This thick mass, to which is added a trifle japan, is applied with a large spatula to the canvas, so that all pores are filled and the superfluous material removed with the spatula. When this priming is dry, thin the mass with equal parts of boiled linseed oil and turpentine to brushing consistency and apply one full coat. If this has not well covered, apply another coat. The further manipulation is carried on as in other sign work where oil colors are used.

— 77 —

Painting Engines and Ice Machinery.

On account of the great variations of temperatures, material of great elasticity and resistance to dampness is required for this kind of work. Ordinary copal varnish will not fill these requirements. Old machinery which shows cracks must be treated with paint remover, while, where there are no cracks, the old varnish must be removed by rubbing down with pumice and water, then painted over with flat oil or japan color and striped and varnished with material that is especially adapted for this work. Lead must not be used on this sort of work, because it does not stand the heat, and if the tone is to be brown, tuscan red and burnt umber would make a rich brown, which would stand pretty high degrees of temperature. For a gray, zinc white would be the best base.

— 78 —

The Bronzing of Plaster Coats.

A soap is made from linseed oil and caustic soda, which is precipitated with a solution of common salt and then filtered. Then a solution is made of four parts of vitriol of copper and one part of vitriol of iron in hot water, which is added to the above filtrate, when a flocculent precipitate is formed that contains oxide of copper and iron in combination with the fatty acids of the soap and is reddish brown in color. This precipitate is repeatedly washed, first in hot, then in cold water, pressed and dried.

Now eight gallons of pure raw linseed oil are boiled with eight pounds of litharge (must be powdered), then filtered and allowed to clear. When clear, fifteen parts by weight of this boiled oil and twelve parts of the dried copper and iron soap and five parts of white beeswax are melted together at moderate heat, and this liquid is applied with a brush to the figures, which have been previously heated to 200 deg. F. Then they are exposed to the air for a few days to dry, rubbed off with a woolen cloth and touched up with bronze powder at edges or other raised lines. Small articles may be dipped in place of brushing.

— 79 —

Putty for Zinc Ornaments.

Take equal parts in bulk of zinc dust, or in lieu thereof zinc oxide and fine Paris white, and mix the same to a stout, plastic mass with a solution of 33 degrees Be water glass. Scrape the faulty place first clean with knife or other handy instrument, then fill it with this mass, which becomes hard in six to eight hours, and if the work is to be fine, smooth it with an agate pestle. This putty also adheres to glass, stone and metals, and is water proof.

— 80 —

Preparation of Woolen Texture for Painting.

A woolen flag that has been patched is to be painted over.

Saturate the new patches with a solution of isinglass and use colors ground in elastic coach varnish, thinned with turpentine only, to which may be added a small portion of beeswax dissolved in turpentine. The principal point is to give the new patches as nearly as possible the appearance of the old parts of the flag or banner.

— 81 —

Painting of Iron Fences with Asphaltum Varnish.

Very much depends upon the quality of the asphaltum varnish, and a cheap article is not to be recommended for this purpose at any time. It should be genuine asphaltum, combined with sufficient oil to make it elastic, but it is here, as with many other materials, first cost is considered before quality. Nor would we recommend the application of asphaltum over an oil priming, because the final coat should be the most elastic. Rather than this, the asphaltum varnish should be applied to the metal direct. Our advice is, prime with red lead or a mixture of white lead and red lead, and finish with a good oil paint, to which, if desirable, a portion of first-class outside varnish may be added. The priming should not be too oily to make the finishing coat more adhesive and stand out with a better gloss.

— 82 —

Ruling Lines on Blackboards.

Oil colors, when thinned with japan and turpentine, will not run in striping, but japan colors should have some boiled oil and only little turps for thinners, if they are used for this purpose. To make the lines stand the continuous friction from marking with chalk and the washing with sponge, a coat of rubbing or flatting varnish should be given, and this rubbed down with pumice and water, because chalk will not mark or hold well on glossy surfaces.

— 83 —

Loss of Opacity or Covering Power in Zinc White.

A barrel of dry zinc white kept in the shop for a year was found to have lost body and become practically transparent, although of excellent covering property when first purchased.

The cause of the change lies in the fact that zinc oxide has the property to absorb carbonic acid from the air, and especially when the material has become moist from one cause or another. Part at least of the zinc oxide changes into zinc carbonate, and while the latter is of good white color it is transparent in comparison with the former. Therefore dry zinc white, if kept in stock for any length of time, should be kept in well closed packages.

— 84 —

Fireproofing Textile Fabrics.

Ammonium chloride, as well as alum solution, are recommended, also waterglass, and these are probably the cheapest mediums for the purpose. A solution which has given excellent results is composed of

4 gallons of water, in which are dissolved 40 ounces chloride of ammonia, 40 ounces boracic acid, 5 ounces carbonate of ammonia, 4 ounces potassium bitartrate and 4 ounces potassium oxalate. The fabric is steeped into the solution for fifteen minutes and then dried.

— 85 —

Varnished Table Tops That Will Stand Heat.

A treatment is wanted for an old walnut table top, that will prevent the cloth from sticking to the varnish when hot dishes are placed on it.

The fault lies in the varnish, if a moderate amount of heat makes the tablecloth stick to the varnish. Very likely the varnish is not made of a hard enough gum, as anything in the varnish line is frequently considered good enough for furniture. This may be so for cheap furniture, but will not answer for the tops of tables on which hot dishes are being placed. In the case above cited, we would recommend a rubbing down of the top with powdered pumice and water, thereby removing the old varnish and preparing a level, well filled surface. This done, a coat of good, hard drying, rubbing varnish is given, which should be well brushed out and allowed to dry. Then a heavy, flowing coat of rubbing varnish should be applied, and when this is dry it is rubbed with flour of pumice until even and washed off. Now it is rubbed with rotten stone and sweet oil, the oil cleaned off and the surface polished with the hand or chamois leather.

If this method is too expensive, the rubbing may be dispensed with and the varnish surface simply "haired or mossed," but the varnish must be of the best quality.

— 86 —

Cheap Paint for Rough Work.

Linseed Oil and Water Emulsion.—Shake 1 pound caustic lime and add enough soft water to make $2\frac{1}{2}$ gallons of lime water, dissolve 1 pound sal soda in $2\frac{1}{2}$ gallons of soft water. Mix the two solutions and stir into the mixture 1 gallon of raw linseed oil. Let it stand for several days, then use it with raw linseed oil in equal proportions as thinner for paint.

Fence Paint, White.—Mix thoroughly and then strain or run through a paint mill 2 parts in bulk of slacked lime in stout consistency with 1 part in bulk of white lead in oil, then thin with linseed oil enough to spread well.

Cheap Mineral Paint for Rough Work.—To 75 pounds of ocher, Venetian red or mineral brown, add 75 pounds bolted whiting and 20 pounds air slaked lime, mix well and thin with equal proportions of raw linseed oil and skimmed sweet milk. Run through strainer, when of proper consistency for application.

— 87 —

Paint for the Dials of Spirit Compasses.

A man who frequently has to repair compasses for ships has been unable to make a white that will stand in alcohol, nor a black for the numbers.

We have had no experience along this line of painting, and find the question a difficult one to answer. We do not entertain the idea that the paint is dissolved by the alcohol, but simply softened and lifted off, as it were. If it were a mere matter of solubility in alcohol, we should have to see that the vehicles used in the paint are insoluble in cold alcohol, and for such hard kauri varnishes can be highly recommended. Amber varnish would be better still, were it not for the fact that it discolors white so badly. We should say that a varnish made of extra pale, hard kauri gum with a moderate quantity of bleached linseed oil and the necessary quantity of turpentine, to which sufficient French zinc in varnish is added to make a stout, white paint, would not be affected by alcohol, provided a good ground is given the dial first. The black for figures, etc., could be mixed from lampblack or ivory black in japan and a good kauri varnish, the latter for a binding medium. Should a glossy white on the dial interfere with the proper application or adhesion of the black numbers, the white could be made from zinc that is ground in paste form with pale kauri varnish and thinned with turpentine to dry flat or with eggshell gloss, and the dial varnished with two coats of extra pale varnish after numbering. An experiment on these lines by painting a strip of metal, steeping the same in alcohol, would be the very best way of ascertaining the value of the foregoing suggestions.

— 88 —

Restoring the Gloss on Linoleum.

Floor varnish is not advisable. A better method and less destructive to the cloth is to rub over the cloth with a mixture of one part each of paraffine and palm oil, thinned with four parts kerosene oil.

— 89 —

Paste for Fastening Oilcloth to Wood.

Mix one pound wheat flour with two quarts of water, in which has been dissolved one quarter ounce of alum, and while constantly stirring with a wooden stick boil the mixture until mushy, so that the stick will stand in it. This tough paste is applied to the table top and the oilcloth laid thereon and smoothed out from the center toward the edges, so that there will be no wrinkles or blisters.

— 90 —

To Keep Cassel Brown in Soft Paste Form.

Assuming that this question relates to paste for distemper painting we would say that in such case, inasmuch as cassel brown is unaffected by alkalies, you may mix your dry brown with some soda lye of 20 deg. B., and then add enough glycerin of 28 deg. B. until a smooth paste is obtained. If it refers to a paste in oil, however, we would advise you to dry your cassel brown sharply, then rub it under the muller with spirits of turpentine until fine, then add linseed oil to give required consistency. But isn't it cheaper to buy your cassel brown already prepared in paste form?

— 91 —

To Make Plaster Paris Set Slow.

Add to the dry plaster before mixing with water from 2 to 4 per cent. by weight of finely pulverized marshmallow root, and you will find that it will require a full hour for the mass to set hard. Not only that, but you will also find that the mass, when dry, can be sawed, filed or turned off and that it will not shrink, crack or brittle. If 8 per cent. of the root, by weight, is added, it will require from two to three hours to set, and the mass will be still harder when dry. When colors are added to the mass, a fine imitation of marble can be had, or if formed into tiles these may be painted, polished or varnished.

— 92 —

Painting of Lincrusta with Oil Colors.

A heavy bodied boiled oil, such as is used in the manufacture of linoleum, i. e., pure linseed oil that is boiled with the required drying mediums, until it attains the consistency of heavy syrup, mixed with the desired colors, is the best material we know of for the purpose.

— 93 —

Removing Grease Spots from Stone Work.

To remove grease spots from stone steps or stone floors, pour strong soda water or boiling hot water over the spot, then lay on a thin batter made of Fuller's earth and boiling water; let it remain on over night, and if the grease be not removed repeat the process. Sometimes the grease may be taken out by rubbing the spot with hard stone, using fine sand and very hot water with soap and soda.

— 94 —

Preventing Coal Tar from Striking Through Oil Paint.

There have been various methods suggested lately, but they are too complicated, and if the coal tar is well absorbed into the wood in that case, we should say that a liberal coat of orange or brown shellac varnish would isolate the coal tar effectually.

— 95 —

United States Lighthouse Paint.

A few years ago the Government used a cheap white or buff-colored water paint on lighthouses and the stone surrounding them, which stood fairly well.

The paint in question is, or was, prepared as follows: One-half bushel of lime is slaked with boiling water and kept covered during the slaking process to keep in the steam. When cold, it is strained through an ordinary sieve or paint strainer, then one peck of salt dissolved in warm water, three pounds of rice flour stirred in water and boiled to a thin paste, one pound Spanish whiting and one pound pale glue, also dissolved, are added to the strained lime mixture, thoroughly stirred and allowed to stand well covered for several days before using.

Before applying, the wash must be warmed up in a kettle or portable furnace and applied with wall brushes as hot as can be done without injuring the bristles. This paint is said to wear well on wood, brick or stone. To produce the buff tone, use French ocher as coloring, but no chrome yellow; and if a reddish buff is required, use Venetian red and ocher.

— 96 —

Red Brick Wash That Will Stand Water.

Stale beer has not sufficient binder to make the paint or wash stand water, and a wash made with it would be worthless. Mix dry Venetian red with skim milk and the action of the lime base will make the curd of the milk insoluble in water, but should the Venetian red be free from lime, then limewater, whiting or quicklime should be added to the milk before mixing the red with it. To ascertain whether the Venetian red contains whiting or lime, drop upon a portion of it some commercial sulphuric acid, and if the red powder does not effervesce lime in the form needed is not present, and the aforesaid alkaline addition must be made. If the color is to be waterproof, however, add to each gallon thereof one-half gallon boiled linseed oil and stir well. Still, the wash without the oil, when properly made, will not wash off for years and makes a good brick renewer.

— 97 —

Finishing Yellow Pine Doors.

Southern yellow pine doors were first sandpapered and dusted off, then given one coat of oil shellac, and when this was dry a finishing coat of excellent spar varnish was applied. This was done in the spring, but in the summer they checked off in places, and in the early fall some of the finish came off in large blotches, leaving the wood bare.

Yellow pine surface is very difficult to make any kind of finish stay on, especially when exposed to the sun, because of the sappy or resinous nature of the wood. We think the cause of the early failure was due to the oil shellac, which is hardly the proper material for outside work, as it is of uncertain quality, judging from the prices asked for it. We would also advise you to never give a guarantee for the durability of a finish on yellow pine doors that are exposed to the weather, but to undertake it at the owner's risk only. To refinish the door in question we would advise you to scrape down to the bare wood and sandpaper the surface; dust off thoroughly, then apply one coat of boiled linseed oil, cut with a little turps, which brush out thin and allow to dry hard. Now give a coat of pure grain alcohol shellac varnish, then follow with your final coat of good outside or spar varnish.

— 98 —

Preventing Paint from Peeling on Brick Walls.

Six months after some brick walls had been painted, in places the paint had peeled off so that there was not a particle remaining. A month later the walls were repainted with the same result. This was probably due to moisture in the wall.

There is no known remedy to prevent even the very best paint from peeling off from damp brickwork, and the conditions of the surface should be examined before beginning to paint. The bricks may appear thoroughly dry and yet contain moisture on the inside. In this case, we think it would have been well to have scraped off whatever paint yet remained on the bad spots and allowed the sun to get its work in on the walls during the hot months and repainted the surface then. Of course, on the north side of a building this would be of little avail, and it would only be doing justice to himself and his patron to call the latter's attention to the fact that under existing conditions a durable job cannot be guaranteed. As the paint adhered in some places and not in others, we can be reasonably sure that the fault was not in the paint, but most likely to dampness in certain parts of the wall.

— 99 —

Marine Paints.

A line of paints which are well considered and extensively sold to the fresh water ship trade are called carbon paints. We append three formulas covering such goods:

- 300 lbs. litharge,
- 300 lbs. powdered wood charcoal,
- 60 lbs. asbestine pulp,
- 30 lbs. lamp black,
- 12 oz. borax dissolved in 6 gals. of water.
- 240 gals. pure raw linseed oil.

This makes a paint which resists the combined action of water and weather to an astonishing degree. The paint is not cheap but good.

Cheaper and not so good, but still good is this one:

- 400 lbs. boneblack,
- 200 lbs. asbestine pulp or china clay,
- 20 lbs. gas black,
- 45 gals. raw linseed oil,
- 24 gals. glass oil,
- 22 gals. benzine drier,
- 24 gals. benzine or naphtha, or, as it is sometimes called, "63 deg. turps."

A good graphite paint is:

- 240 lbs. plumbago (use good stock),
- 120 lbs. asbestine pulp or china clay,
- 20 gals. good varnish oil (coach oil),
- 65 gals. raw linseed oil,
- 6 gals. turpentine.

They are made for fresh water work and are very extensively used upon bottoms in the great lakes trade. We do not know that the paint has been tried in salt water, save when some of the lake vessels go into the salt water, as they do every year. We are unable to give any definite information as to the condition of the bottoms of such craft and do not think that the matter has ever been investigated.

There is no evident reason why those formulas should not furnish a very good salt water paint. The paints would not be likely to develop any marked anti-fouling properties, but might if there was some verdigris or like material ground into them—something that would rest unsatisfactorily in the stomach of a barnacle. The paints in question will make most excellent anti-corrosive paints for all sorts of exposures.

The following is a good but costly anti-fouling paint:

Grind equal weights of white lead, Brunswick green, verdigris and arsenic to a paste with linseed oil and varnish, and then thin with mixing varnish.

Here is an enamel paint largely used:

150 lbs. Venetian red,
140 lbs. oxide of zinc.

Grind to a paste with a combination of equal parts of linseed oil and a good strong varnish. Thin with rosin varnish.

Here is a poison enamel paint:

175 lbs. oxide of zinc,
15 lbs. oxide of mercury.

These are ground into 25 gallons gloss oil and thinned, if need be, with benzine.

— 100 —

The Blacking of Gold Bronze on Exposure.

When using bronzing liquid, never add turps, for the acid in the turpentine will, sometimes in two or three weeks, change the color of bronze. The best thing to add, when bronzing liquid becomes too thick or gummy, is benzine, which is a more volatile thinner than turpentine. A great deal depends on the ground you put liquid bronze on. For outside work, which is generally painted in oil color, it is best, when dry, to use thin glue water and let it dry before applying bronze liquid, as the glue water will not permit the acid in the oil color to affect the bronze. To prevent atmospheric influences after bronze has been applied, go over parts which have been bronzed with thin glue water. When this is dry, you can varnish it over. Although the gold bronze will lose a little of its luster, we have known that bronze applied in this way will last three or more years, and will stand nearly as good as gold leaf. Gold leaf, of course, will last twenty years and is more durable. Very often after bronze has been applied in above way, instead of using thin glue water and varnish over same, very thin coat of white shellac can be applied over bronze, which will retain the brightness and durability as long as the shellac will last. Above is about the only way to keep bronze from tarnishing. We do not know, nor have ever heard, of any gold bronze being in the market, which will not tarnish when exposed to the elements.

— 101 —

Kalsomining Old Whitewashed Ceilings.

Whether it works well or not, it is unsafe to put kalsomine over old lime whitewash or old kalsomine, because of the tendency to flake. Kalsomine is stronger in its binding properties than ordinary lime

wash, therefore it requires a strong ground. To remove old lime wash or kalsomine is often a difficult and expensive task, and it is better to bind the old coating down before beginning to apply the kalsomine. To do this effectively, proceed as follows: If the walls or ceilings have been whitewashed, and it does not pay to take it off, wash the surface with strong vinegar and, when dry, give a good coat of glue size or, better, two thin coats, applied fairly warm, and have the room as warm as possible. This makes as good a foundation for kalsomine as can be had on old lime wash. On old kalsomine that cannot well be removed, apply one or two good coats of alum and glue size, which is prepared as follows: Dissolve one pound of white rosin soap in hot water, after slicing the soap fine, soak one pound of white sheet glue in cold water until soft, pour off the surplus water, stir the glue and put in boiling hot water until the glue is thoroughly dissolved and liquid. Now dissolve two pounds of alum in hot water, then stir the liquid glue and soap water together and add the alum solution. Then thin the mixture with warm water to working consistency. This makes a safe ground on which kalsomine will work very well.

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Kind of Linseed Oil Used in Grinding White Lead.

So far as we know, raw linseed oil or bleached linseed oil is commonly employed for that purpose, because boiled oil would tend to discolor the product.

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How Chamois Skins Should Be Treated.

Chamois skins should never be left in water after using, but should be wrung out and hung up to dry, and spread out carefully so as to leave no wrinkles; neither should they be used to wipe soft colors, because paint stains form hard spots and help to wear out the skins more rapidly. Neither should the hands be wiped on chamois skin, as it is liable to become greasy thereby. Never put the skin in hot water—nothing more than lukewarm, as it will curl up and become tough. If a chamois skin has been ruined by paint or grease, it is recommended to soak it in a bucket of soft, clear water, to which has been added a gill or two of ammonia, over night, and next morning rinse it out in pure water, after which use freely of white castile soap and water. This process need not require over fifteen minutes' time, and it is said that when so treated the skin is of better service than a new one, because it has been broken in and is free from lint.

— 104 —

Preparing Kalsomine.

Dissolve one pound white sheet glue in hot water, after it has been soaked in cold water. Make a saturated solution of alum in water, then mix 25 pounds of bolted English cliffstone parts white in water to a stout paste and add to this the alum solution, then add the liquid glue and test the mixture for its binding properties, and if it does not bind well add more glue and let it stand to cool. If the kalsomine is

to be tinted, use distemper colors, i. e., colors that have been ground fine in water, but avoid colors that are affected by lime, such as chrome yellow, chrome green, Prussian blue, etc., and the tinting colors should be added to whiting mixture before the glue is put in. To determine whether the tint is satisfactory, dip a piece of paper in the mixture and let it dry. When ready to apply it thin with cold water to required consistency and use good kalsomining or wall brushes. Lay your work off evenly and avoid laps. If an edge dries, stop and wet it up with a clean brush and clear water and do the same where you have missed a spot and finish up with kalsomine. Should your kalsomine dry too fast, slow it up with glycerine, say one-quarter pound to two gallons kalsomine, for in that case you have too much glue and alum and your kalsomine is liable to crack and flake. Practice a little about your shop or your own house, and you will soon determine the proper relation between pigment and binder.

— 105 —

Darkening of Oil Paint on Exposed Surfaces.

A painter undertook to paint the front of a dwelling having a southern exposure; the surface being old plaster in good condition, never before painted. The contract was for one coat of boiled oil and two coats of paint of a doe brown tint. Good kettle boiled oil was used for priming, and two days were allowed for drying. Pure white lead tinted with umber was used for the second coat. This was given two days to dry, and was followed by the final coat, also of pure white lead, tinted with pure oil colors. The weather was dry and the job looked fine when finished, but when the sun shone on it the next morning, great dark spots began to appear, and two hours afterward the whole surface looked as if coated with graphite paint. The next day the painter gave another coat of the paint, followed by the same result. The two following days were cloudy and rainy, and the paint went back to the color as originally applied, though a trifle bleached.

We would say that the turning of the paint to dark gray may be traced to sulphurous substances in your lead or oil, and you should have made a trial with other lead and oil, and if this gave a different result your first material should be examined by a competent chemist. It is just possible that you are depending too much on the brand of your lead for its purity, but it is well known that the term "Pure White Lead" on a package does not necessarily mean pure, and that only the name of a corroder on the package is a guarantee of purity. It is scarcely possible that in your case the change was due to sulphur gases and we believe that the cause is to be found in your material, and most likely in what you call pure white lead, because you say that after a few cloudy days the tint lost its gray black color and returned to the original condition, though a trifle bleached. If you have bought your material from a reputable house, they will gladly help you to ascertain the cause of trouble, but if you have used poor material you will only have yourself to blame.

— 106 —

Gilding Letters Cut in Soft Stone.

Stop the suction in that part of the letter that is to be gilded with one or two applications of shellac varnish; then give one good coat of oil color, preferably chrome yellow. If there is any danger of the oil color running out over the shellaced surface, give the sides a coat of the white of egg or glue size, which may be washed off when the gilding is finished. Use fat oil gold size for laying your leaf and do not begin gilding until the size has set so well that it will not become dead or wipe off when the finger is passed over it lightly, otherwise the gold leaf will be drowned and without luster.

— 107 —

Paint Blistering on Locomotive Cabs.

Cabs of locomotives, painted in a cold, damp place, blister, except on panels of poplar. Blistering always occurs on panels made from old sills of cars, no matter how the paint may be mixed. The painter who meets these difficulties also wants to know the best method of mixing paint for locomotives. In view of these facts we think the blistering due to the damp atmosphere in part and partly to the use of shellac varnish and first coating with too oily a paint on top of the shellac. That blistering does not occur on panels of poplar we would attribute to the fact that poplar is a very soft wood, into which the shellac varnish sinks more deeply, giving a less glossy surface than it does on the hard panels made from old sills. For the latter purpose we would suggest that shellac varnishing as a first coat be discarded and instead given a thin coat of lead color, made from keg lead and lampblack, thinned with half oil and half turpentine, adding a little coach japan. Let this stand a few days, if possible, then give one coat of flat lead color, made from keg lead and lampblack, or drop black ground in japan and thinned with turpentine only. This dry and hard, fill up with knifing lead, where necessary, and putty up. If the job is to be rubbed apply your guide coat and rub next day. Then give two coats of color ground in japan, thinned with turpentine, or, if it must be, your two coats of color and varnish, but we prefer the former, it being less apt to blister. If the outside surface of the cab is not in bad condition one coat of lead color, flat, is sufficient; but for new work or where the old paint has been removed two coats of lead color and two coats of knifing lead cannot well be dispensed with. On the inside of the cab such great care is not required. This can be washed down, a coat of shellac varnish given, and right on top of this a coat of color in japan and one coat of finishing varnish.

The painting of the tank is practically the same as for the outside of the cab, with the exception that the surface must first be freed from scales and rust before the lead color is applied.

The trucks under the tanks, after being cleaned from oil and grease with benzine, may be given a coat or two of good black and varnish. The smokestack is best coated with lampblack in oil and japan when the engine is in steam, so that the coating will bake on, as that will

prevent blistering. The boiler, while still hot, should be given a coat of pure linseed oil, and right on top of this, before becoming too hard, a coat of dry red lead mixed with keg lead and oil. All other parts—the dome, sand box, driving wheels, fire box and frame of engine—should have a few coats of lead color, same as on the cab, then be filled and coated with drop black in japan and varnished or finished with locomotive black.

— 108 —

To Preserve Copper from Tarnishing.

Pulverize one ounce of hard gum copal, put it into a bottle, and add to the powder one ounce each of bisulphide of carbon and benzine and two ounces each of methylated spirits and spirits of turpentine. Cork up well and shake frequently. This will give a durable, almost colorless lacquer, of which, if two or three coats are applied, it will preserve the copper.

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Black Ink for Show Cards That Will Not Spread.

Take one-half pound of white beeswax and three ounces of ivory soap. Melt these, and when amalgamated add one ounce dry lamp-black. Mix well, heat strongly, and add one ounce orange shellac, dry. Heat the mass again, mix well, and when cool bottle for use. You will find that you can draw the finest, as well as full lines, without spreading.

— 110 —

Repainting of Rusty Tin Roofs.

If the roof is too far gone, it will be to your discredit to attempt to repaint without informing your patron of the futility of the task. If, however, the rust has not eaten through the tin, try sandpaper, which will generally remove thin layers of rust after which dust off the roof, and give a coat of boiled linseed oil or a very thin paint, and this dry, give a coat of the paint you usually employ for this purpose. If the rust spots are very deep, use equal parts of muriatic acid and water to loosen the scale, then scrape it off, wet the spots with soda water and rinse with clear water, after which proceed as above.

— 111 —

To Make Varnish Dry Without Luster.

Dissolve one-fourth pound white or yellow beeswax in a pint of turpentine in a steam bath, same as glue is dissolved. It is best to slice the wax first, as it will dissolve more readily that way. When this is added to one quart of varnish, the mixture will dry nearly flat. If an eggshell gloss is desired, only half the quantity of wax and turps should be added to a quart of varnish. The wearing properties of the varnish are not injured by this addition.

— 112 —

Making Two Coats of White Paint Cover on Yellow Pine.

As yellow pine is very difficult to cover in two coats with white, because the paint must not be laid on stout on account of the tendency to peel, it is best to follow the advice which has been most successful when carried out properly, and that is to prime first with a mixture of 7 parts pure linseed oil and 1 part pure pine tar, which must be well rubbed in. When this is dry, follow with one coat of pure white lead, thinned with pure raw linseed oil and very little drier, to which is added enough good lampblack to throw it off the white to a slightly gray cast. This coat must also be brushed out well, to prevent blistering, and when thoroughly dry and hard give the final coat, which should be made a little stouter than the first coat and without any coloring matter. It is essential that the lead and oil be pure, as adulterated paint will not stand on such work, nor would it give the body required, unless applied so stout, that it would be sure to peel.

— 113 —

Alum in Wall Paper Paste.

Alum in paste will not injure the colors in the paper or the paper itself, unless it is used in excess. To a bucket of paste, that consists of four pounds of flour, two ounces of alum is sufficient. Select the clear crystal alum for the purpose, as the other grades are too strong. For pasting papers on glossy surfaces omit the alum from your paste, but add instead about one-half pint of clear syrup to each gallon of the flour paste. The alum and the syrup serve a similar purpose, i. e., to avoid the striking through of the paste and thereby staining the paper. Another point must also be observed, that of the consistency of the paste. On a rough wall use it stout, on a smooth wall comparatively thin. The only paper that might be affected by alum in the paste is gilt paper, and in such case it is well to omit the alum and use a little carbolic acid to keep the paste from souring.

— 114 —

Paste for Pressed Paper.

Take two pounds of flour, mix with enough lukewarm water to the consistency of thick cream, add one ounce of powdered crystal alum, a pinch, say one-quarter ounce, of pulverized rosin and one-half ounce white sugar of lead, also powdered. Now add boiling hot water and stir until the paste is thoroughly cooked and shows adhesive properties. Use stout on rough walls and thin on smooth walls.

— 115 —

Finishing a Dining Room and Parlor.

The most attractive finish was desired for the walls and woodwork of dining room and parlor in a house costing about \$2,000; the question was also asked whether it would be in good taste to finish both rooms alike.

The first question is rather difficult to answer, as the writer does not state the nature of the wood, nor whether he desires to paint or paper the walls. The prevailing style is to give a natural finish to the woodwork and have the walls in light tints, harmonizing with the tone of the finished wood, or to stain the woodwork with some fanciful pigment stain, generally forest green, with dull green wall paper or tint for the walls. Forest green enamel for the woodwork is also in style. When this scheme is employed, it is in perfect taste to have the dining room finished in a similar manner, especially if the two rooms communicate, though it would perhaps be better to have the tints of the dining room walls a little deeper. At any rate, there should be no decided contrast.

— 116 —

Filler and Paint for Iron Castings.

Mix 3 parts by weight of keg lead that is fairly stiff with 5 parts black filler, 2 parts whitening and 5 parts silica or silex, which make into a stiff paste with a mixture of 2 parts each of ordinary rubbing varnish and coach japan, and 1 part of turpentine by measure. If not dark enough to suit, use dry lampblack to deepen. Use this paste as a putty for the sandholes and other rough places, pressing it in firmly with the putty knife and level off. For surfacing, thin this paste to brushing consistency with turpentine only, and apply it as a paint; sandpaper when hard. As many coats of this should be applied as are required to give a smooth surface, and each coat sandpapered. This surface will resist a fair amount of heat, but it is not actually fireproof. For that purpose a putty made from litharge and glycerine, or a putty made of 1 part dry litharge, 2 parts black filler and 3 parts fine iron filings, mixed with silicate of soda (waterglass) will serve best. Of course, these putties will not do for surfacing. For finishing over the surfaces any good paste paint of the proper color, when thinned with one-third coach japan and two-thirds turpentine, will give a good eggshell finish. For gloss finish thin the paste with one-third coach japan and two-thirds varnish or boiled oil.

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Durable Stain for Shingles.

We take it for granted, in considering this, that you do not consider first cost, but that you wish to prepare oil stains that will wear well and will not fade or look unsightly for a reasonable period. We would point out that a pigment stain is the most durable in point of permanency, and that aniline colors had better be avoided. If the shingles are for roofs from which water is to be collected into cisterns for drinking purposes colors with lead or copper bases should not enter into the stains in quantity. To make the stain use earth or mineral colors chiefly that are ground to the utmost degree of fineness, as these only will hold up well in a stain and thereby effect a very decided saving in the final cost. If the stain is wanted for dipping the shingles into, all that is necessary is to break up the oil color or oil colors with equal parts of boiled linseed oil and liquid dryer, then thin to the consistency of water with benzine, and keep the stain well stirred.

while dipping the shingles. For brush work, treat the colors in a similar manner, but thin with turpentine and have the stain somewhat heavier. The principal point about a stain is to use as little pigment or color as possible, but have that little of greatest possible staining power. Accurate figures cannot be given; proportions must be ascertained by practice. The red and brown oxides, umbers, siennas and vandyke brown are best adapted for yellow, brown and red stains. For the various green tones mixtures of lampblack or umber, strong ochre and Prussian blue had best be used, and chrome yellows and chrome greens be omitted for reasons given above.

— 118 —

Mixing Dry Red Lead with Linseed Oil for Painting Iron Structures.

A great deal depends on the purity and fineness of the dry red lead, but we should say that 25 pounds of pure, dry red lead should be thinned with one gallon of pure raw linseed oil, by stirring the oil in gradually, and should the mixture become lumpy it should be strained through a piece of wire cloth or paint strainer. This will make one and a half gallons of stout paint, which, when brushed well into the iron structure, will not run. If the job is to be hurried, a gill of good oil drier or turpentine japan may be added to the mixture. If the iron be fairly smooth and plenty of elbow grease used, such paint will cover 700 square feet one coat to the gallon.

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Coating Lead Water Pipes with Paint.

As paint will not stand on wet or damp metal, you must drain the water out of the pipe and let it dry. Then apply a coat of best coach or spar varnish, thinned with plenty of turps. When thoroughly hard apply same paint as is used on the walls, but be sure you have the pipe drained and dry every time you apply a coat of paint.

— 120 —

A Quick Drying, Serviceable Floor Paint.

If first cost is not objectionable, we know of nothing better for old floors than to add some dry mineral paint, as ochre, Indian red, umber, burnt sienna, etc., to shellac varnish, and thin this mixture with enough alcohol to make it spread freely and allow of laying it off. It dries so rapidly that a second coat may be given one hour after the first has been applied. Two hours after applying the second coat the floor should be flushed with clean, soft water, and in about ten minutes it should be mopped up with a soft cloth. Wood alcohol shellac varnish will serve as well as grain alcohol shellac, and wood alcohol may be used for thinning.

— 121 —

White Lead in Oil Hardening Under Water.

A painter, who bought white lead in 250 pound kegs, kept water on top of the lead after opening package, but in a few days found a thick

crust or gummed-up layer on top that had to be run through a hand mill before it could be used.

The answer to this is very simple. Your so-called white lead is not pure lead. It is, no doubt, a mixture of zinc and barytes, which will not stand water, but will set hard under its influence. If you ask the party who sold you this white lead, he will tell you that you must put oil on top, in place of water, and give you some plausible reason why this is necessary for that particular brand. If you are paying for pure white lead you are being imposed upon; if not, you should have known that you must not use water.

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What Is Whiting Composed Of?

Whiting is prepared from white chalk or carbonate of lime, large deposits of which are found nearly everywhere, especially in England and France. This white has a soft and earthy fracture and is without polish. It leaves a mark and adheres to the tongue without any greasy feeling. It has sometimes a yellowish cast, but is more frequently grayish, seldom a clear white. Contains a small portion of silica and sometimes traces of clay, magnesia or iron. The best of brands are those known as English Cliffstone and American Paris White. Commercial or common whiting is usually very gritty and very much off to the gray in color.

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Method to Soften Japan Colors That Have Become Hard in Collapsible Tubes.

If the colors are gummed up merely, work them out on a slab with muller or spatula, adding turpentine gradually, until working consistency is obtainable. If necessary, strain them to free the color from particles of skin. Should the colors have become solid in the tubes, cut the tubes and remove the color, and cut it up in small particles and saturate these with chloroform or coal tar benzole. When softened work out with muller or spatula, and allow solvents to evaporate before adding japan or varnish. If benzole is used, be careful to have no light or fire near, as it is very inflammable. Should any of the colors, as in the case of lakes or vermilion, be badly livered they may as well be thrown away, as good work cannot be done with these.

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Roughstuff for Carriage Work.

We present the following: No. 1. Equal parts of Reno Filler and white lead in oil, by weight, made into a stout paste with equal parts, by measure, of coach japan and quick rubbing varnish. This paste is thinned for use with turpentine. Two coats may be applied per day.

No. 2. Mix 5 pounds Reno Filler with 2 pounds white lead in oil, and give enough rubbing varnish and coach japan to make a stiff paste, which reduce to proper consistency with turps. Only one coat of this should be applied on the same day.

In making roughstuff with white lead in oil have the latter fairly stiff ground.

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Waxes for Glazed Papers.

We are not familiar with the special treatment of waxes that are to be used on glazed papers, but would say that, with some slight modification that may be required after a trial, the following method may answer as well on glazed paper as on other kinds. Dissolve paraffin wax in benzine in a hot water bath, and apply the warm solution to the paper with a sponge, laying the sheets between flannel cloth to absorb any surplus. For quick work the paraffin wax may be dissolved in carbon disulphide, when the paper will be ready in five minutes after solution is applied.

If both sides of paper are to be waxed, the paper may be dipped into the solution, but the sponge treatment is giving better results.

Another method is to lay the paper flat on a smooth table and go over it rapidly with a heavy hot iron, against which is held a piece of white beeswax or paraffin wax which, melting, runs down on the paper and is absorbed by it.

— 126 —

Finish for Hardwood Floor That Will Not Show Scratches.

Good alcohol shellac varnish, when properly applied, will dry so hard that it cannot be scratched readily, and when suitably colored will not show white marks, even when scratched. Here are two formulas for making shellac varnish that admit of free working and easy application. To 5 pounds bleached shellac add 2 pounds Venice turpentine (the clear goods are best) and 16 pounds 95 per cent. alcohol (grain or wood alcohol, or a mixture of the two). Put all in a large glass jar or earthen crock and cork well. Shake occasionally or stir with a clean wooden paddle until all the shellac is dissolved, and the varnish is then ready for application. If desirable, some earth color, like sienna or ocher or umber, may be added to the shellac, but these must be impalpably fine and of the strongest staining power, because only very little should be used to prevent the varnish from becoming too opaque.

If a darker varnish is equally suitable, as it should be for oaken floors, especially dark oak, the solution may be made with 4 parts orange shellac, 2 parts Venice turpentine and 18 parts of 95 per cent. alcohol, to which color may also be added. In both cases the Venice turpentine has the function of imparting elasticity to the varnish and to permit its being spread uniformly and its being laid off evenly. Better make a test in the shop first on similar wood, and if too stout to work freely, thin with more alcohol until satisfactory spreading property is attained. For hardwood finish, if a little coloring matter in the varnish is desirable, it should be of the rich, transparent sort, so as not to hide the grain of the wood too much. Two coats will make a very hard, durable finish on a floor, and though somewhat expensive finish for floors, it has many advantages over fat varnishes.

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Sizing Burlap or Canvas Walls for Painting.

The surface of a burlap-covered wall has had several coats of kalsomine or other water paint; therefore it will first be necessary to ascertain the binding property of the old paint. If in good condition, you may begin to paint as you would on a hard plastered wall, omitting glue size, using pure white lead and raw linseed oil for first coat, and following up as is your custom for the succeeding coats in gloss or flat work. If the old work is chalky, however, it should be broomed down thoroughly and then a coat of glue and alum size given or a coat of suction varnish, such as is offered by many varnish makers, will also answer. In making a glue size for this kind of work, use 2 oz. of alum to every pound of glue, and have your size thin and fairly warm when applying it.

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Silking, or Enameling, of Varnish.

F. B. Gardner, formerly superintendent of the varnish department of Brewster & Co.'s renowned carriage works, in New York City, defines this deviltry in varnish as follows: Silking, or enameling, defines a varnished surface, which, on drying, assumes the appearance of silk or pressed leather. He says that it may be caused by varnishing in a room where the temperature is below 70 deg. F., or where there is draught; or it may be caused by the addition of turpentine to the varnish without allowing it to stand long enough to amalgamate with the oil and gum in the same. We would add to this that varnish applied on damp, humid, sticky days, or the use of a brush from which the oil has not been thoroughly removed or the mixing of different brands of varnish will also bring about this condition of surface, and that the only remedy known is to remove the objectionable coat by rubbing down with pumice and water.

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Filler to Answer for Both Hard and Soft Woods.

The very best filler that we know of for this class of work is shellac varnish, but we take it for granted that you want a shellac substitute, something that will cost you far less than shellac varnish. Take, say two pounds ground sillex or the same quantity of finely pulverized china clay, stir into this one pint of good liquid drier, beating the mass thoroughly; then add gradually while stirring three quarts of extra light hard oil finish or a good, pale furniture varnish; let stand awhile and then strain through a fine sieve. If too stout to work freely, thin with spirits of turpentine. The sillex or clay must be bone-dry.

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Testing Linseed Oil for Presence of Mineral Oil.

To detect the presence of mineral oil in linseed oil, place some of the suspected oil in a large test tube, and add to it a concentrated solution

of soda or potash, shaking it well; then adding some warm water and shaking again. Let the tube stand undisturbed about twenty or thirty minutes and the mineral oil, if present, will separate from the soap which has been formed by the linseed oil and soda solution.

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Wall Paper Loosening on Hard-Finished Walls.

The application of glue size and sugar is required only for preparing painted or varnished walls and not for plastered walls. The walls of a kitchen are apt to be smoky, if not greasy, and should have been cleaned instead of applying the size. A good, thin flour paste, with about two ounces of alum dissolved in water to a bucket of the paste, put on as thin as possible, just enough to cement on the paper, is sufficient for a wall that has no suction; but where the wall is soft or porous, the paste must be put on thick. The vapors generated in a kitchen will soften the size and loosen the paper.

— 132 —

Matt Gold in Glass Gilding, with Burnished Outlines.

Lay the leaf which is to form the matt gold center in the ordinary way in varnish size, and you will find that on the opposite side, in contrast with the burnished gold, it will appear decidedly dead or flat. The outlines that are to be burnished are laid in isinglass or gum arabic sizes, which is applied with a clean camel's hair spalter, the leaf laid on, the glass set up edgewise, and when dry the leaf is rubbed briskly with refined cotton until the desired luster is obtained. Then a second leaf is laid in the same manner, and when dry rubbed over lightly; then washed repeatedly with sizing to secure a spotless surface. Now it is ready for the design, if such is desired.

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Preparing Painted Walls for Wall Paper.

When painted walls are to be papered they should first be well cleansed with suds made from white Castile soap and warm water, such suds to be applied with a wall brush, scrubbing lightly, and then sponged with clear water, using a large sponge, and dried with chamois skin. The next important point in papering painted or varnished walls is the preparation of the paste, which must differ from that used for plastered walls, inasmuch as alum must not enter into its composition, and requires an addition of gummy binder to that of the starchy nature wanted for other work. Make a wheat flour paste, as usual, but omitting alum, instead of which add to an ordinary bucket of paste a solution of three sheets of isinglass in one pint of hot water and two ounces refined glycerine, or if the isinglass cannot readily be obtained, use one pint of best golden syrup in its place. By following the foregoing suggestions there need be no fear of the paper not sticking permanently unless other causes, such as continual dampness, arising steam vapors, etc., should be removing agents.

— 134 —

How Should Graining Color Be Prepared?

For graining in oil, thin your paste colors with boiled oil and turpentine. If it does not flow well, add a little soap or whiting. For distemper, have your colors ground in pulp form in water, and thin with stale ale or beer. In winter time, to keep the color from creeping, rub over the groundwork with common whisky before beginning to apply the color.

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To Clean Soiled Wall Paper.

First thoroughly dust off the walls and ceilings wherever the paper to be cleaned may be. Tie up two quarts of wheat bran in a coarse flannel cloth or bag made of flannel and rub it over the paper briskly, taking care to miss none of the space.

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Polishing Paste for All Kinds of Metal.

The following is highly recommended as a first-class cleaner of brass, copper, nickel, etc.: Pulverize one part by weight of oxalic acid, 15 parts peroxide of iron, and 20 parts rotten stone; mix and sift to remove any and all grit; then rub this with 60 parts palm oil and 4 parts vaseline to a smooth paste. Apply with flannel or other soft cloth and polish in the usual manner.

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To Make Cloth Waterproof and Elastic.

Take one-half pound pure Para rubber, cut into small pieces and dissolve in enough disulphide of carbon to make a liquid mass of the consistency of thin syrup. Also melt two pounds of rosin, and add to this two gallons of oil, previously boiled with litharge; in other words, heating the oil and rosin together; take from fire, and before the mass becomes quite cold, add the rubber solution. Should this composition dry too slow, add some good drying japan, sufficient to dry in 36 or 48 hours. The mixture should be applied warm, and if too thick, heat it in a sand or water bath without direct flame. The cloth must be previously soaked in a solution of alum and water. Any drying color may be added to this mixture.

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Proper Preparation of Wax Finish in Color.

Proceed for the priming and subsequent coat or coats same as for an oil color finish, thin for thin coat, with equal parts of oil and turps, adding enough beeswax, that has been dissolved in turpentine, to give a dead sort of gloss.

In order to obtain a surface thoroughly uniform, some water is added to the paint, which, on brushing out, lies over the surface like dew and allows the workman to paint without laps or shiners, because it does not permit the turpentine to evaporate quickly. Should the

surface be uneven in spite of good workmanship, a coat of sour milk or buttermilk is said to remedy the defects.

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Silvering on Glass and Bronzing on Glass.

1. To produce a mirror it is best to use quicksilver, proceeding as follows: Lay a piece of tinfoil on a smooth and perfectly flat surface and pour mercury over it to the depth of one-eighth of an inch. Have the glass plate to be coated perfectly clean and dry, and slide it gently over the mercury, just a trifle below its surface, and when glass is well covered, hold it under pressure for a while and then stand it on edge to drain.

2. To silver on glass for sign work, the following is highly recommended:

Solution A.—Dissolve twelve Troy grains of Rochelle salts in boiling water; then add, while boiling, sixteen grains nitrate of silver that have been previously dissolved in one ounce of water; continue to boil ten minutes longer; then add enough water to make twelve ounces in all.

Solution B.—Dissolve one ounce nitrate of silver in ten ounces of water; add liquid ammonia, drop by drop, until the brown precipitate is nearly, but not quite, dissolved; then add one ounce of grain alcohol and sufficient water to make twelve ounces. Mix equal parts of solutions A and B thoroughly; pour the mixture on the glass, which must be wet, but free from grease, etc. It is best to first clean the glass with moderately strong soda water and have it well rinsed.

The solutions should be made with filtered or distilled soft water, and the mixture be allowed to stand a few days before using it. It will keep for a long time when bottled and well corked. This process will also answer for mirrors, but is more expensive than No. 1.

3. See also No. 71. The sizes given for laying gold leaf on glass will answer for gold bronze as well, and the brilliancy of the burnish will depend to a great extent on the quality of the glass to which the bronze is applied, and on the grade of your bronze powder.

The quicker the bronze hardens on the glass, the brighter will be the effect, but it must not be expected to successfully rival gold leaf.

— 140 —

Difference Between French Yellow Ocher and Ordinary American Ocher.

The selected grades or brands of French ocher are highly valued, because of their uniform bright yellow color, which, without the addition of chrome, give a natural chrome yellow tone, or at least the nearest approach given by earth colors. Neither this tone nor color, nor the fine, smooth working properties of the selected French ocher has yet been attained by American ochers, at least not in appreciable quantities; and therefore the value of French ochers is twice, even thrice, as high as that of good grades of American ochers.

— 141 —

Killing Knots in Wood.

Alcohol shellac mixed with red lead will do the work well on inside work; glue size and red lead and gutta percha, dissolved in ether, are also well spoken of. But where the sun's rays have free access, either inside or outside, all these preventatives fall short of the mark. The sun will draw the pitch and make it show through paint in spite of all these precautions. Even sizing the knot with oil size and laying a leaf of gold or silver over it, has failed in some cases. For fine work, it is best to place a hot iron over the knot, and when a good portion of the sap has come out and been removed by scraping, lay two leafs of gold or silver over it, and this will be found a sure cure.

— 142 —

To Paint Ornaments or Letters on Cloth Covered Books.

Dissolve gum shellac in 95 per cent. alcohol at the rate of one pound of shellac to three pints of alcohol, and mix with it any dry color desired. If it becomes too thick, thin with more alcohol. This works free, does not bleed out, imparts brilliancy to the color and wears well. Will also answer on paper.

— 143 —

Flatting of Tuscan Red Trimming Color.

Tuscan red is composed chiefly of oxide of iron, enriched by the addition of lake, and all oxide of iron pigments have a tendency to go flat, unless the undercoats are thoroughly hard and dry before finish is applied. Not only that, but a glossy coat over high gloss will always give a dead appearance, same as a flat coat is apt to show up glossy when put over too flat a ground.

Therefore, hold your groundwork for the trim semi-flat and do not use turpentine in your finishing coat of Tuscan red, and for extra precaution, add a little exterior varnish, but let it be good varnish that contains neither rosin nor benzine.

— 144 —

Papering a Wall Paper and Paint Store.

Advice is asked as to the best way of papering a double store; the front part to serve as a salesroom, the rear part as a display and stock room.

No, we would not advise you to paper both sides alike, especially as you state that they are connected only by a small door, having a wall between them. We would suggest that you have the front part or salesroom papered in light tints, both for walls and ceiling, with a border representing a fairly deep molding, selecting the tint for walls so as to set off store fixtures as well as the goods to best advantage, and yet have the whole harmonizing and pleasing to the eye. It is impossible for us to give you an idea as to color from this

distance, and you had better rely on your own taste in that particular. As to the rear part, we would suggest a somewhat deeper tint and plain paper, without designs or ornaments, so as not to interfere with the effect in exhibiting the various wall paper designs, etc. A pearl gray or silver gray tint would probably be the best background for this room. Light must be the chief consideration in a display room, and this must influence you in your selection.

— 145 —

Lettering on Cotton Fabric.

Size the surface only, where the letters are to be placed, with a weak solution of gelatine or white sheet glue, to which a little glycerine has been added in order to keep it elastic. The lettering should be done with tube colors, which are to be thinned with pure boiled linseed oil, in which has been melted some pure beeswax, say one-half pound of beeswax to one-half gallon of the oil, and sufficient spirits of turpentine to make the color dry semi-flat. This is important, as it will keep the color from peeling and yet elastic enough to prevent it from breaking.

Each succeeding coat should be held even a little less oily, and this treatment will answer for linen, shirting, etc., as well. The principal point is to prevent the color from striking through the fabric as much as possible, therefore it must not be too oily. If the letters are to be solid, use opaque colors; if they are required to be transparent, select transparent colors. As to the brushes, use similar to those used in fine sign writing.

— 146 —

Oak Staining in Various Styles.

Various effects in staining oak may be had by any of the following treatments, the solutions or decoctions being repeatedly applied, until the desired effect is obtained:

1. Lay on liquid ammonia with a sponge or brush. The color thus given to oak does not fade. When dry, rub over with spirits of turpentine; then fill and varnish. In place of the liquid ammonia bichromate of potash dissolved in cold water will serve as well and give a richer effect.
2. Whitewash the dressed oak with freshly slaked lime, and when dried rub off the dry lime with a stiff brush thoroughly and dress with boiled linseed oil.
3. Apply a strong solution of common soda, giving two coats. Sand-paper lightly and finish with linseed oil.
4. To darken oak, German cabinet makers use very strong coffee, and to give a very dark effect they put iron filings into a mixture of equal portions of sulphuric acid and water, applying the resulting solution repeatedly until satisfactory. This stain penetrates deeply into the wood.
5. A strong decoction of green walnut shells will bring oak to any dark shade desired, even to black.

6. Sixteenth century finish or antique oak may be produced by sponging oak with a mixture of equal parts of sulphuric acid and water, or by staining it with finely powdered raw umber in thin shellac varnish.

7. The golden oak finish, so prevalent in furniture, is obtained by staining quartered oak with a mixture of two parts coach japan, one part best turpentine asphaltum varnish and two parts turpentine. The wood is then filled with a paste filler, that is colored with burnt umber and a little dropblack, and finished in the usual manner.

— 147 —

Tools Required for Gilding and How to Burnish Gold Leaf.

The tools required for gilding on glass, wood or iron are very few in number. A camel's hair spalter for applying the size to glass and a sable hair pencil or brush for wood or iron, especially heavy sign work. A so-called gold knife with long, slender blade for cutting the gold leaf books, a "tip" for lifting the leaf, made of two pieces of paste board, between which a small quantity of camel's hair is laid and glued together; a cushion made by laying a piece of cotton on one side of an oblong piece of wood, 6 by 8 inches, over which is tightly stretched a piece of chamois skin, to lay on the leaf. A good, soft duster, a piece of crayon chalk, a tracing wheel, a pouncing bag, some refined white cotton and the necessary pencils and brushes for shading and backing up, complete the outfit. The burnishing is done with the cotton.

We would recommend the "Gilders' Manual" as a book of reference.

— 148 —

The Best Paint for a Tin Roof.

We have referred this question to a thoroughly experienced painter, who says: "There is a great diversity of opinion on this subject, and it is a difficult task to give an impartial answer. Metallic brown has been the orthodox material for roof painting these many years, and it has given the utmost satisfaction wherever I have employed it, providing the roofs were in fit condition to be painted. Failures with metallic brown cannot often be laid at the door of this material, but must be looked for in the thinners, or in the bad condition of the tin. Rust once formed cannot be arrested by a coat of paint, no matter how good that paint may be, nor can it be expected that the thinning of a good pigment with rosin or mineral oil or other substitutes for linseed oil will tend toward the longevity of the paint under any conditions. Any one who knows what trash some tin roofers employ for first coating new roofs will not be surprised when the best of material gives way.

"I have tried Venetian red and have had as good results as from metallic brown, but I have always used standard brands, ground in paste form by reputable manufacturers, never any snide stuff that was loaded with barytes or other worthless base, such as marble dust or clay. Have also used graphite, but this has been so recent that I cannot pass an opinion as to the probable outcome. A brother painter is

very enthusiastic on the subject of liquid coal tar for tin roofs and points with pride to some jobs that he did with coal tar, with which he mixed some heavy boiled linseed oil, thinning with heavy naphtha, but the jobs are rather young yet, not over a year old, at most."

— 149 —

Treatment of Hard Maple Floors.

If the floors are well dressed and smooth sandpapered, proceed by giving two or three coats of white shellac varnish. For first coat use the shellac varnish rather thin, so as to make it spread more freely. This treatment will give your finish as good a wear as it is possible to obtain.

— 150 —

Paint for Metal Ceilings.

The first thing to do is to clean the ceilings before repainting with soapsuds to which a little ammonia may be added, scrubbing brush, sponge and elbow grease and a good rinsing with clear water and sponge afterward. If there are no defects in the paint, such as chipping or scaling, any paint, such as is used for inside work, will serve the purpose, and it depends on the use of the room in question whether lead paint or zinc paint should be employed. In a drug store or laboratory, pure zinc white should be used, while for school-rooms, halls, stores or saloons, white lead can be applied with safety. If two coats are to be given and the color of the ceilings is to be in delicate tint or in clear white, the last coat should be zinc white in any case. The mixing of the paint, of course, depends on the finish wanted, flat or glossy, and is the same as for any other ceiling or wall work, that is simply to be recoated.

— 151 —

White Lead Unsuitable for Priming Iron Work.

That white lead in oil does not make a good priming paint for iron is certain, but the subject is too extensive a one to be explained in these columns. White lead does not have the oxidizing influence on linseed oil that red lead has, and therefore it does not become so hard and cement like, nor has it the opacity of red lead.

White lead makes a porous paint with linseed oil, and the more hydrate of lead is present, the more porous the paint. Red lead, on the other hand, is an oxide of lead, and acts on linseed oil as a strong drier, making a practically non-porous paint. Mixtures of two parts of red lead to one part of white lead are now much in favor and seemingly giving excellent results. Trials have so far advanced that engineers in the East are almost universally adopting this material for the priming and second coating of structural iron. Oxide of iron as priming for iron work is losing its hold very generally and is used only by those who look to cheapness rather than durability.

— 152 —

Painting a Frame House in Colonial Style.

A house that has been painted pearl gray body, deep maroon trim, Venetian red sash and bronze green shutters, is to be painted in Colonial style, with yellow body and white trim and sash and green shutters. The owner will not pay for more than two coats.

For first coat on body of house use strictly pure white lead tinted a decided buff with French yellow ocher, thinning with two-thirds raw oil and one-third turps, holding the paint stout and brushing it out well so as to cover. For second coat mix 80 parts pure white lead with 20 parts good American zinc white, tinting to the desired shade with medium chrome yellow or lemon yellow and ocher, thinning with pure raw linseed oil and a little liquid drier. For the trimming and sash use for first coating pure lead with a trifle of lamp-black, just enough of the latter to throw it off the straight white, thinning also with two-thirds raw oil and one-third turps. A little drier will be found necessary for these first coatings. For finishing coat use with the pure lead about 15 per cent. zinc white and thin with raw oil and a little liquid drier. If this looks somewhat yellow on application, it will bleach out white on drying. For the shutters any good chrome green will cover well in two coats.

— 153 —

Dressing for Renewing Old Carriage Tops.

Unless you use quite a great deal of leather top dressing we should advise you to purchase it ready made, because it will not pay you to set your shop or house on fire, and the melting of asphaltum is quite a risky piece of business for a novice in the art. We shall give you the least costly formula for a black enamel dressing for old canvas or leather tops, as follows: Melt 25 pounds asphaltum with one pint of boiled linseed oil; take your kettle a good distance from the fire, and before cooling, thin with turps or with equal parts of turps and benzine to the consistency of thin varnish. If on cooling it does not work freely, use more thinners, and if it does not dry quick enough, add sufficient coach japan to insure drying.

— 154 —

Painters' Measurements and Prices.

We can give general rules only for measuring, and you will have to exercise your judgment as to conditions of surface. So, for instance, if the siding has deep impressions, add 50 per cent. to the area of surface; for rough weather-boarding, etc., allow double measure. Window and door frames, in and outside, also double. Venetian shutters, double the measure of plain work. Window sash is to be measured square. Corner strips on frame houses, if painted with a different color from siding, to be double. Cornices should be allowed 50 per cent. to the actual measurement. The prices per square yard for ordinary tints are 10 cents for first coat, 6 cents for second coat and 4 cents for third coat. For solid colors, like blue, chrome yellow, chrome green, etc., 14 cents for first, 10 cents for second and 8 cents

for third coat. For deep green, bronze green and vermillion, 16 to 20 cents for first and 12 to 15 cents for second coat.

For good jobs of graining, \$1.00 per yard, including groundwork, is allowed, with a leeway of 25 to 35 per cent., according to the amount of labor or quality of color required. We are unable to give you the price charged per roll for hanging wall paper, as that depends very much on the conditions of the walls, as well as on the quality of the paper; and we think that you might be the better judge of that after one or more trials.

— 155 —

Cheap Method of Gilding Chairs, etc.

The question was asked how the gilt chairs are made that are sold for less money than gold leaf can be put on for.

The chairs in question are not covered with gold leaf, but with a first-class gold bronze. They are first filled with wood filler, smooth sandpapered and the gold bronze applied in the wet way. Before this has a chance to set hard, dry bronze is rubbed over the surface with cotton until a burnish is obtained that almost equals gold leaf in luster. Many housewives buy gold bronze and liquid for this very purpose, and obtain very fair results in ornamentation, which is all that is wanted in gilt chairs, etc.

— 156 —

Deodorizing Lubricating Mineral Oils.

To each gallon of the oil add three ounces chloride of lime; put the mixture in a wooden cask and while stirring violently add one ounce of muriatic acid to each gallon. Keep on stirring, so as to bring all of the oil in contact with the chlorine gas.

Now pass the oil into another cask containing dry slaked lime, which absorbs the free chlorine gas. The oil is then drawn off and may be flavored with oil of myrbane or synthetic oil of thyme (*organum*), both of which are comparatively strong and cheap.

— 157 —

Making Vermilion Dipping Paint.

So you would like to have a formula to make a satisfactory vermillion dip, hey? So would many another man in the paint line. You do not state whether you want a flat or a gloss dip. In the first place, you require a vermillion that has the best orange mineral, not ordinary red lead, for its base; next you want to avoid the use of make weight material, such as barytes, clay, silica or marble dust in connection with your vermillion, and if inferior, cheapening base must be employed, select one of light specific gravity. Now, if the dip is to dry flat, grind your pigment in a good coach japan (that is free from rosin) and raw linseed oil and thin with turpentine. If it is to be thinned with benzine, however, grind in raw oil and break up the paste with a liquid drier that will not curdle oil and thin with deodorized benzine (not gasoline). Under no condition, however, make more at any time than can be used in, say, forty-eight hours.

Dipping vermilions for one coat dipping to dry with gloss are fakes and will not only partly settle, but will clog and become a liver, unless used as soon as made. The varnish usually employed will not act well with pigment containing oxide of lead as base.

There are pigments that will hold up better than vermilion in the red group, but these are more expensive and lack body to such an extent as to prevent their use.

— 158 —

Papering a Parlor with Beamed and Panel Ceiling.

In a parlor, the side walls of which are to be papered in white and gold relief and the brick breast brought up in white enamel, the ceiling is beamed the length of the room and paneled between, the side beams being lower than those in the middle of the ceiling.

From this description it would appear that the architect has intended to carry the cove moulding at the bottom of side beams round the entire room, casing up the end walls flush with the plaster, so as to avoid the unfinished appearance of butting the beams into the plastered walls, but the carpenter has probably misunderstood the drawings. There are several methods to partially overcome the difficulty:

1. Use no frieze, but carry the wall paper up as far as the plastered wall continues, cutting in between the beams.

2. Carry the frieze round the room about 18 to 24 inches below the lowest beams. Above this use a ceiling paper that matches the side walls, cutting it in between the end of the beams, and either tint the ceiling panels with distemper or use a plain tint paper.

3. Use the ceiling paper for the frieze, keeping the picture moulding at the level of the top panels of the doors. The frieze can then cut in between the beams.

— 159 —

Graphite Paint for Smokestack.

Opinions differ on this point, but we would prefer graphite in boiled oil to coal tar or asphaltum varnish, unless the stack is to be very glossy and jet black, in which case we should use a high-grade elastic black varnish.

— 160 —

To Keep the Polished Tops of Bars and Counters in Good Condition.

Mix one pint boiled linseed oil with one-half pint of strong vinegar, and after cleansing the bar or counter tops with lukewarm water, take a woolen cloth saturated with above mixture and rub briskly over all parts of the top until clean and polished.

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Attaching a Block and Fall to a Smokestack.

An iron smokestack of the height of fifty to sixty feet is generally of a fair diameter, and has knees or brackets riveted on inside on which to get to the top. A man climbs up on these and takes

with him a rope, one end of which he throws to the ground, and then pulls up hooks, block and fall. If the stack is not provided with brackets in the manner described, it will be necessary to have extension ladders or scaffold.

— 162 —

Getting Dirt out of Varnish Brushes.

After soaking the brushes for a few days in raw linseed oil, get a good sized unplanned board, not too rough, fill the brush and work out on the board, bearing on hard. This will cause the dirty oil to ooze out at the butt end of the bristles, which should be wiped off quite frequently. Continue the treatment for about fifteen minutes, then wipe dry and work into some varnish remnant. Work out over the fingers, getting well into the butt. With a brush cleaned out this way, even a beginner can lay a clean coat of color and varnish, and after a week's steady use the brush should be clean and broken in well enough to do any job of varnishing. When not in use, the brushes should be placed in a dust-free brush keeper.

— 163 —

Cheap Method of Frosting Glass.

The cheapest method we know of is to dissolve epsom salts in gum arabic water and let it stand over night. To use it lay your glass flat and flow on the solution; then when it is about to set, pounce or lay off. Another method is to use sugar of lead ground in equal parts of damar varnish and turpentine, and stipple it on the glass. To do a good job by either method requires practice.

— 164 —

Brick Stains, How to Prepare.

To stain the bricks on a building to correspond with new bricks in an addition: Take fine sand, that has been washed clean and dried, and mix with a like quantity of good Portland cement in water fairly stout; then add dry Indian red or Venetian red and yellow ocher until the proper color is obtained. Then thin down to the consistency of ordinary whitewash and apply with wall brushes, taking care to keep the stain well stirred while using. For buff or cream colored brick stain, use yellow ocher of the required shade and depth as coloring matter, adding commercial whiting or slacked lime, if very light shades are required.

— 165 —

To Climb a Flagpole Without Climbing Spurs.

We have seen men climb poles over 100 feet in height without anything but their stockings on, while others came down again in a hurry before they were up 25 feet. It depends on your agility and gymnastic training, as well as your physical ability. If you are lacking in these qualities you had better remain on the ground, unless it pays you to erect a scaffold. But why not use the climbing spurs, as a flagpole is painted from the top downward and the marring could be obliterated.

— 166 —

How to Prepare Deeply Penetrating Ebony Stain.

Much depends on the nature of the wood that you desire to stain. Soft woods will take the decoctions readily, while the hard woods have great resistance.

For hard wood, such as walnut, boil 40 parts by weight of gall nuts, 4 parts of rasped logwood, 5 parts of copperas and 5 parts of verdigris in soft water for at least one hour; strain the mixture through linen and apply to the wood while warm. Then give it four coats of iron filings that have been dissolved in three times their weight of vinegar. Must also be applied warm. For soft wood, a stain made by boiling together over a slow fire one gallon vinegar, one-half pound copperas, one-quarter pound Prussian blue, two ounces nutgalls and two pounds extract of logwood, and then adding a half pint measure of ferric oxide, will do the work, if applied warm, after straining.

— 167 —

Good Putty, How It May Be Prepared.

To make your own putty without the required machinery is a tedious and wearisome job. Glaziers' putty is made of whiting and raw linseed oil; at least pure putty should be so made. It requires 85 pounds of whiting and 15 pounds of linseed oil, and to make it properly take bolted American Paris White and mix it with oil as stiff as you can, then take this soft dough and add more whiting, which can only be incorporated by pounding the mass with a stout club or wooden mallet. When stiff enough so that it will not adhere to your fingers, set the mass aside for a few days to give it what is termed sweating, then pound again, and if still too soft add more whiting and incorporate it by continued pounding. If the putty is wanted for quick drying, use boiled instead of raw linseed oil, or use one pound dry white lead to every nine pounds of whiting.

Much of the putty sold is composed of the most ordinary kind of commercial whiting or marble dust and an admixture of linseed and mineral oil, and lacks binding properties.

— 168 —

Marble Polish and Cement for Marble.

Melt in a hot water bath one pound of Chinese or Japan wax or carnauba wax; when melted, add one gallon spirits of turpentine and take from the bath, stirring until cool, then add one pint of gold size by stirring it well in. Apply to the dry marble and rub with a soft cloth until the desired polish is obtained. The gold size may be omitted, but the polish will not be as brilliant or as durable. To make it wear well rub daily with a dry cloth.

To cement marble to marble, mix sifted oyster shell lime and finely powdered gum arabic with water to a fairly stout mush, which apply in thin layer to both fractures and press firmly together, then allow to remain undisturbed for twenty-four hours and remove with a sharp knife the part of cement that has been squeezed out.

— 169 —

Cleaning Paste for Show Windows.

We can recommend the following paste as an excellent means for cleansing plate glass: Dissolve one pound of castile soap in three pints of water by boiling over a slow fire, stirring continuously until the soap is thoroughly dissolved. Allow to cool somewhat, but while still lukewarm stir into this soft soap as much as is needed to make a homogeneous mass of a powder, mixed in the following proportions: 12 ounces prepared chalk, 9 ounces French or Vienna chalk and 6 ounces fine tripoli. Pour the mass into moulds to set. When using, rub onto a moistened cloth, sponge or chamois, apply to the glass and let it become fairly dry, then rub off with soft cloth or chamois skin and wipe clean afterward in the usual way.

— 170 —

Mixing Gold Bronze for Striping on Kalsomine.

Dissolve gum shellac in 4 parts by volume of grain alcohol, then add your gold bronze, 1 part of the dry powder in 3 or 4 parts of the solution. Go over your stripe again when the first application has dried and work as rapidly as possible. When your striping is well done you can burnish it by rubbing with wash leather.

— 171 —

Will Oil Paint or Enamel Paint Stand on Whitewashed Brick Walls?

Required to paint a wall in a brewery that is washed almost daily, with gloss paint. The wall has been white washed, the room formerly being used as a storeroom and not subjected to moisture.

If the whitewash is of the ordinary kind, to which salt, etc., has not been added and not extraordinary thick, it will suffice to brush the wall down with stiff brooms or brushes, so as to take all the loose lime off. If the limewash has had salt or glue added for a binder and is therefore too hard to be removed by brooming, scraping will have to be resorted to. This done in either case, a thin coat of oil paint should be applied, which will sink in and bind whatever lime may remain on the wall. Upon this coat, which should be fairly flat, the joints should be puttied with a good hard drying lead and whiting putty, and over this dry and hard, brewers white or enamel may be applied without risk in as many coats as may be required. Whether it will stand washing depends on the quality of the enamel or gloss paint.

— 172 —

Best Way to Fasten Burlap on Walls or Ceilings.

Treat it pretty much in the same manner as you would muslin or canvas. If not wide enough to go over the whole space, have the various breadths sewed together as carpets are sewed, moisten the fabric and begin tacking it on one end or at the top for a partition with double rows of tinned or galvanized tacks; six ounce tacks will do,

eight ounce are better. Stretch it out toward the edges and ends and use double rows of tacks at ends, around door and window frames and at bottom of partition. Do your trimming after it has been securely fastened. In panel work on ceilings the burlap is fastened and held down by the mouldings, but on large plain partitions it is well to tack it here and there to keep it from sagging by its own weight.

— 173 —

Removing Paint from Blinds and Shutters.

Required to remove paint from outside blinds that are badly alligatored and cracked, having been painted twenty years or more before.

We should advise you to unhinge the blinds, take them to some convenient place and burn off the old paint, which, with the proper lamp and scraper, can be quickly accomplished, leaving a good surface to repaint on. This is the quickest method we know of. Or if you do not care to resort to burning, or to buy one of the many paint removers offered, you may use a strong solution of concentrated lye and water to soften the paint and then scrape it off. In this case you will have to wash the blinds thoroughly, allow them to dry and then sandpaper them, which is quite a job and much more troublesome than the burning-off process.

— 174 —

Fire and Weather-Proof Paint.

We have not a great deal of faith in the fire resisting properties of paint that contains oil in any form, and believe thorough impregnation of wood the only real safeguard. However, we give a formula as follows: One part by weight each of salt, alum, waterglass and tungstate of soda are mixed with four parts by weight of unslaked lime and ground in raw linseed oil to proper consistency for application. Three coats make the wood fire-proof, and it is claimed that the paint has stood the weather for nearly thirty years.

— 175 —

Colorless Spirit Varnish for Labels, Whitewood, etc.

Dissolve five ounces bleached shellac in one quart of 95 per cent. grain alcohol. When well dissolved, add one-half pound of granulated animal bone black that has been heated to drive off moisture that may be present, and boil all in a water bath for five minutes. Now filter a small quantity through filter paper, and if not colorless enough add more bone black and boil again. When test turns out satisfactory, filter the hot varnish through silk first and through filtering paper. In place of the grain alcohol methylated spirit may be used, if the odor is not objectionable. The varnish must be applied quickly, as it sets very rapidly.

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Best Material for Free Hand Relief.

For interior work the following has been found to work very nicely: One pound of plaster paris, one-quarter pound dry white

lead and two teaspoonfuls of bicarbonate of soda (baking soda) are intimately mixed with water to a thick paste, and immediately fill the rubber bulb and proceed to work out the design, that you have previously marked out. You can tint this material to any tint or color desired by mixing the necessary quantity of dry color with the plaster paris. The bicarbonate of soda is added to keep the material from setting too quick, and while it is still wet you can sprinkle brocades or bronze powder over it.

If you desire to use color that will not stand soda you can add pulverized marshmallow root in place of the baking soda, say one-half to three-quarters of an ounce to each pound of plaster of paris.

— 177 —

Guarding Against Fires in Paint Shops.

This question is a timely one in view of the inflammable nature of the material stored in the shops or storerooms, and the careless or rather thoughtless manner in which many shops are taken care of. While fires, even with the utmost carefulness, cannot always be prevented, many of them could be traced directly to the loose way in which simple precautions are neglected. Strict regulations for the employees and strict supervision will minimize the risks. Rules should be made for and enforced in every shop, enjoining the utmost cleanliness and care for rubbish, oily or greasy waste or rags, and airtight metal receptacles should be provided for their deposit during the working hours, while at quitting time such matter should be removed from the building. Working clothes, such as overalls, etc., should not be permitted to remain in the shop, unless provision be made in the shape of metal lined, tightly closed chests or closets. Dry lampblack must not be allowed to be stored otherwise than in covered metal packages. Nor should oils, varnishes, liquid driers, turpentine, benzine, gasoline, benzol or alcohol be permitted to stand about in open cans or pots. No open light in the shape of lanterns or lamps should be permitted to be carried into or used in the shop. Smoking in the shop or carrying a lighted cigar, cigarette or pipe into the shop must be prohibited at all times. If the shop cannot be heated by any other means excepting stoves, the stoves should be placed as far away as possible from the place where the paints, oils and volatile thinners are stored.

If the shop cannot be lighted by electricity and light is indispensable at times, safety lamps should be used, but turpentine, benzine, etc., should never be drawn from their receptacles with the aid of an unprotected light. Paint mixed ready for use and left over in pots should be well covered, especially those in which volatile thinner or varnish is introduced. Stoves must be as much as possible surrounded with sheet zinc and care taken not to overheat the same.

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To Finish a Parlor in White, Trimmed in Gold

We should say that with gold trimmings the white finish should be neither a dead flat, nor should it have too high a gloss. It should have a soft velvety finish that is produced by rubbing down

the final coat of varnish with water and rotten stone. The usual method is to give three coats of white lead, flat; each coat is smooth sandpapered when dry. Next one coat of equal parts white lead and zinc white, which when thoroughly hard and dry is rubbed down very smooth. Then a coat of French zinc white in damar varnish, thinned with turpentine only, is applied, and this dry, the same mixture, to which is added some good pale varnish, is used as the final coat of paint. Then a coat of best damar or other white varnish, to which a trifle of zinc white in damar is added to kill the yellow cast of the varnish. When the work is to be gilded or bronzed, however, the zinc white must be omitted from the varnish. After rubbing down the finishing coat of varnish with water and rotten stone, the surface should be rubbed with sweet oil until dry, having the soft and uniform appearance of velvet.

— 179 —

Staining Redwood a Dark Green, and Filling Redwood.

As you are to match furniture that has been finished in green, you cannot employ the usual method of using a verdigris solution in strong vinegar, but must make up a pigment oil stain. Not knowing the exact tone of the green you wish to match, we cannot give you a formula for the colors required to produce the stain, but would give you the following as a guide:

Take chemically pure chrome green in oil as near the shade of the green on the furniture as it is possible to obtain it, and if not dark enough, add Prussian blue or drop black, or both of these. Break up the color thoroughly with japan or liquid drier to the consistency of thick cream, then thin with pure spirits of turpentine until it is as liquid as a thin varnish. Strain through cheesecloth or very fine sieve, and test the resulting stain on a piece of redwood. After the stain has been applied with the brush, it is allowed to set and then wiped out with a piece of soft cloth, and the effect can be varied according to the length of time allowed before wiping out. The color of the varnish must also be taken into consideration in matching the stain, and the stain must not be applied after the redwood has been filled. If it is intended to fill the redwood, it must be done after the stain has dried, and the best filler for the purpose in this case is to take one ounce of the green that has been used in making the stain, about a tablespoonful of raw linseed oil and two tablespoonsful brown japan and one quart of turpentine, mixing thoroughly and beating into this one pound of cornstarch, and strain through a paint strainer. Apply with a brush, as you would varnish, and let it stand fifteen or twenty minutes, and rub off the surplus filler with excelsior or soft rag, then allow the surface to remain undisturbed for at least twenty-four hours. Now give one or two coats of white shellac varnish, which, after hardening, rub down with flint paper and finish with as many coats of varnish as you can afford to give. For a first-class job, two coats of shellac should be given after staining and filling, and two or three coats of rubbing varnish, then it should be rubbed with pumice and water, cleaned off after standing a day with a chamois, rubbed with water and rotten stone,

standing again a day, washed clean as before, then rubbed with olive oil until dry.

To fill redwood for natural finish, use the filler as described above, with the exception that the one ounce of green is omitted and a few ounces of burnt sienna substituted. The filler tends to harden the fiber of the wood, and the finish should be similar to that outlined above.

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Glass Embossing and Silvering on Glass.

Don't expect the formulas given will always work at sight or on the first trial. When an experiment fails to produce the result looked for, it is best to study over the formula and then think a while over the matter and find out, if possible, what omission may have caused the failure. You might have had better success if you had used formula No. 1 in No. 139. Your solution may have been wrong or your glass not clean enough. It may be well for you to employ Draper's method, as follows: Dissolve separately 500 grains Rochelle salts in 3 ounces of distilled water, and 800 grains nitrate of silver, also in 3 ounces of distilled water. Add silver solution to one ounce of strong ammonia, until brown oxide of silver remains undissolved. Now add alternately ammonia and silver solution until the latter is exhausted, when a little brown precipitate should remain; then filter the ammonia and nitrate of silver solution. Just before everything is ready to proceed with the silvering, mix the Rochelle salt solution with the silver solution and add enough distilled water to make 22 ounces in all. The glass to be silvered should be cleaned with dilute nitric acid or with plain collodion and tissue paper. Coat a sufficiently large tin pan with equal parts of beeswax and rosin melted and fasten strips of wood an eighth of an inch thick around the bottom of the pan. Pour in the finished solution and quickly put in the glass, face downward, one edge first. Carry the pan to a window and rock the glass slowly for 25 to 30 minutes. Take out the glass and set it on its edge on blotting paper to dry. When thoroughly dry, lay it, face up, on a dusted table. Make a rubber by stuffing a piece of soft buckskin loosely with cotton and go gently over the whole surface in circular strokes. To polish the silvered surface, put some very fine rouge on a piece of buckskin laid flat on the table; impregnate the rubber with the rouge and rub the surface with it for at least one hour, or until surface appears black when held in opaque position. It is best to warm the solution and the glass before beginning to silver in water heated to 100 deg. F.

Stencilling or embossing on glass is done as follows: On the flashed side of the glass or any side of plain glass, lay a coat of black asphaltum varnish, mixed with dry red lead, say one ounce of the latter to one pound of the former. When dry, the stencil or pattern plate is laid flat on the glass over the black, and then a preparation of soft soap in hot water is applied with the aid of a stencil brush, well rubbed into the edges of the stencil to make it airtight and prevent the turpentine getting under the edges of the stencil plate and leaving ragged outlines. Now take another stencil brush dipped in turpentine and rub off the black asphaltum, lift off the stencil and wash away the deposit

left by the soap and turpentine with cold water. The plate is now ready for the etching with "fluoric acid," which is poured over the glass and imparts sharp, clear outlines like those of a pattern or stencil. When the acid has acted, rinse with clear water, and if the embossing is not clear enough repeat the operation with more acid. Fluoric acid is prepared by pulverizing Fluor or Derbyshire spar and dissolving it with sulphuric acid. It must be kept in lead bottles or gutta percha bottles with corks of similar material. Etching on stained glass is done as follows: Use the glass that is colored on one side only. Pounce your design or letters on the colored side, cut in with black asphaltum varnish, to which some wax should be added in a water bath and thinned with turpentine. When dry, put a border of beeswax all around the outer edge of the glass and cover all the parts to be treated with fluoric acid. Let it remain until the colored portion of the glass is eaten through, then pour off the acid and wash well with clear water, remove the beeswax and the varnish, and the letters or design will stand out clear, while the balance will be of the original color.

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Finishing Radiators in White with Gloss.

Use old files and wire brushes to thoroughly remove all the old paint and loose scales, wash down with benzine and allow to dry. Give a priming coat of flake white in japan, thinned with turpentine only, and allow to dry hard. Next give a coat of French zinc in damar varnish, also thinned with turpentine, to which is added a little white enamel varnish, say one tablespoonful of varnish to a pint of the thinned zinc paint to produce a faint eggshell gloss. For the finishing coat use French zinc in damar varnish, thinned to brushing consistency with a good pale baking varnish. If heat can be introduced to bake on every coat, blistering need not be feared, but if heat cannot be had until the job is finished, every coat must be given plenty of time to thoroughly harden before another is applied.

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To Remove Fly Specks from New or Filled Woodwork.

For new woodwork use two parts of ammonia and one part spirits of turpentine to remove the specks. The ammonia will readily clean off the spots and the turpentine will keep the ammonia from raising the grain of the wood. For filled wood take fine sandpaper or dry pumice stone, powdered, and rub over the surface lightly, then dust.

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How to Make Quick Drying Size for Aluminum Leaf and Gold Leaf.

A good size, on which the leaf may be laid in four hours, is made from two gills of gold size japan and one gill of fat oil. For a twelve-hour size, take one-half pint fat oil and a dessertspoonful of gold size japan. For gold leaf add to the size a dash of medium chrome yellow that has been ground in japan. For aluminum leaf the size may be

used clear or with a dash of flake white in japan. For good work that is to wear well and show a good burnish we would recommend the twelve-hour size, or, still better, fat oil only.

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What Is Gypsum?

Gypsum is not plaster of paris, though made of the same material—gypsum rock. Plaster of paris is the calcined gypsum rock, which is heated to about 300 deg. F. to drive off the water of crystallization, which amounts to about 20 per cent. of its weight. Gypsum, or terra alba, is known to chemists as the hydrated sulphate of lime, with the formula CaSO_4 , and when fully hydrated contains 21 per cent. of water. It is a useful extender for paints, such as ultramarine blue and other colors, and as a base for Venetian red, etc., and is specified by railroad chemists for freight car and bridge paints, etc. Plaster of paris is not permissible as a base in paints because of its tendency to set hard on contact with moisture, even when mixed with linseed oil.

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Bleaching Linseed Oil by Exposure to Sunlight.

In Terry's "Pigments, Paint and Painting," the statement is made that linseed oil may be bleached by exposing it to sunlight; but an experiment showed that exposure to sunlight without admission of air will not do the work and that oil bleached by air and sunlight will turn dark again, when corked in a bottle, in spite of exposure to the sun. It requires a certain amount of oxidation in connection with bleaching oil by sunlight, otherwise it is merely a settling process. Linseed oil can be bleached or refined by various methods, notably by filtration through Fullers earth, ocher or bone black. The quickest method, however, is the treatment with sulphuric acid and subsequent washing by steam.

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Cause of Paint Fading, Deadening and Sinking In.

On an old house, which had not been painted for eight years the paint was entirely off in certain places on the exposed sides, while on the north side and in protected places the paint was still good. You painted over all with white lead and gold ocher and, naturally, where the wood was bare and very dry it absorbed the oil from your paint and left the latter practically dry and dead after a short time, while there was no absorption on the old paint. This explains the faded appearance in those places. That the new house with the cypress siding should show a like fault is more than we can comprehend, unless your oil was really at fault. Did you use strictly pure white lead and pure golden ocher and did you have sufficient linseed oil in your priming? Much ocher is not a good material to use in priming cypress.

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To Remove or Kill Moss Growth on Stone or Brick Work.

Wet the surface in question well with water, to which has been added 2 per cent. by volume of carbolic acid. After an hour or so the growth can be removed with a stiff brush and clear water. If some of the growth should still adhere, repeat the operation.

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The Kind of Oil Best Suited for Mixing Paint for Tin Roofs.

Unless you can obtain good heavy bodied kettle boiled linseed oil, we should strongly advise you to use nothing but pure raw linseed oil, to which add a half pint of good oil drier in winter and a quarter pint in summer for every gallon of oil. Do not use turps, benzine or gasoline for thinning if you want the roof well protected, and avoid the use of rosin or mineral oils.

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Mixing White Lead so as to Cover in One Coat on Sign Work.

If this refers to white lettering, the painter will be able to get along with one coat, providing the ground is not too strong, by using pure white lead that is ground very stiff in oil, thinning it with turpentine only for inside signs, and equal parts of raw linseed oil and turpentine for exposed work. The lead must be held, in either case, about as stout as artists use it in oil color painting. If white is to be the body of the sign one coat of white lead will not be sufficient, no matter how heavily applied or what the ground may be.

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To Prevent Gold Bronze from Turning Brown.

A painter finding difficulty with gold bronze which he said turned a brown drab, asks the reason.

Just what kind of a color brown drab is we don't know; we suspect it is the coppery hue so prevalent in gold bronzes. You say you followed the directions on the package. We doubt the directions were intended for domestic use of the bronze, such as picture frames and other work not exposed; but for signs exposed it won't do to mix the bronze with benzine and varnish and then apply it, as it will tarnish every time. The way to get the best result is to take a strong size and color it with chrome yellow. Paint the sign with this size just as you want it to appear when finished, that is, in shape of letters, etc. Then, when the size is nearly dry, just when the tack is perceptible to the touch, apply the bronze by dipping into it with a rag and rubbing it on. Thus the bronze is on the outside of the size. Rub it well. Varnish will discolor pure gold leaf. Then, as a matter of course, it will tarnish any metal bronze. To varnish over bronze, put on a coat of isinglass, then a clear varnish.

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Heating Dipping Paints in Vats.

The question was asked whether it was advisable to run steam pipes into dipping vats to keep the paint warm and make it run or drip more freely.

Although we have no direct experience in that line, we may say that the idea strikes us as an excellent one, providing the pipes can be so placed that they will not interfere with the proper working of the vat, and held at such a temperature that part of the paint will not be baked. They will then act the same as a steamjacket about an iron or copper kettle or mixer, and act as well or even better at less expense. The only drawback to perfect success by this method during freezing weather is that if the implements that are to be dipped and the room in which they are to be dried after being dipped are not of approximately the same temperature the result may be worse than if the paint is not warmed at all, because the paint on coming in contact with a chilled surface or being placed to dry in a chilled atmosphere will tend to creep or crawl. If the paint is warmed up to 80 or 90 deg. F., the temperature of the implements on immersion should not be below 65 deg. F., and the temperature of the drying room not less than 70 deg. F. We should certainly advise the making of a trial on a minor scale.

— 192 —

Lime Whitewash—How to Prepare and How to Apply Properly.

The principal point in preparing lime whitewash is to have the lime well slaked. Select good builders' lime, soak it with warm water and allow it to fall into fine powder in the open air. Then, if wanted for inside and so prepared that it will not rub off, make it very thin with water and to every pail add a pint of flour, previously made into starch or paste; or, better still, dissolve two pounds of ordinary alum in boiling water and add this solution to every two gallon pail of whitewash. Apply the first coat very thin, so as to bind it on the wall and the addition of alum will prevent the second coat from rubbing up the first coat, thereby making a more uniform surface.

For outdoor work, take one pound of lime and slake it as above. Then take one-quarter pound Burgundy pitch and dissolve by gentle heat in a pint of linseed oil; now add to the hot lime one gallon skimmed milk, then the mixture of pitch and oil a little at a time, stirring all the while. Finally add three pounds of bolted whiting. If to stout to work evenly, add more skimmed milk.

The addition of one part of salt to three parts by weight of lime, or thinning the unslaked lime with the brine of a mackerel or salt herring barrel, will also make a whitewash with enough binder to stand the weather.

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Varnish to Prevent Brass from Tarnishing.

Place one ounce of pulverized gum shellac and one pint of mythylated spirit in a bottle, which cork tightly. Keep in a warm

place and shake once in a while. When the shellac is dissolved, pour off the clear fluid and apply it with a camel's hair brush to the brass, which must be well cleaned and polished, and if it is possible, heated before the varnish is applied. This varnish can be had very clear and transparent by filtering it through asbestos fiber.

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Removing Spots That are Caused by Water in Ceiling or Walls.

Take unslaked white lime, dilute with alcohol, and paint the spots over with this mixture. When dry, which ensues very quickly, as the alcohol evaporates the lime forms an isolating layer; the ceilings or walls may be sized and painted in any way and the spots will not show again.

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To Clean Stained Marble Without Destroying Its Polish.

The following from an excellent authority is highly recommended. Take equal parts by weight of ox gall, pulverized soap, and pipe clay, to which add some turpentine. Apply a thick coating to the stained marble, and when thoroughly dry rub it off and wash with soft, warm water. If badly stained, a second application will be required.

— 196 —

Mixing Asphaltum and Coal Tar.

An attempt was made to melt black asphalt in its crude or hard state and mix it with coal tar and turps, but the asphalt settled to the bottom in a very few days.

The best plan is to melt your asphaltum with a small portion of linseed oil. When liquid, take from the fire to a safe place and thin with turpentine or turps and benzine to the consistency of thin varnish and allow to cool. Decant carefully or strain through a fine strainer into a barrel or mixer and throw away the sediment. To the strained asphaltum varnish add the coal tar, which should be of the proper consistency so that no more thinning will be required after the two are mixed. If the coal tar be too heavy, thin it first with light coal tar oil before adding it to the asphaltum.

There may be several reasons for the trouble you refer to. Your asphaltum may contain quite a lot of sandy matter, or your melting is imperfect, or you may cut the life out of your mixture by thinning in the cold way. If you have both the asphaltum varnish and the coal tar of proper consistency before mixing, there will be no settling out.

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The Darkening of Shellac Varnish in Metal Packages.

To prevent shellac from darkening it must not be kept in metal packages such as tin or iron. It may be kept in wood, but stone or glass jars are best, and either of them must be very clean. You can dissolve gum shellac in cold grain alcohol, wood alcohol or acetone, but the former is the only medium that makes a first class shellac

varnish. Put four pounds gum shellac in a jar with one gallon 95 per cent. grain alcohol and cork up well. Stand in a warm place and occasionally shake, until the lac is dissolved, which will be in a few days. The process may be hastened by placing the jar in warm water first and, when well warmed up, in fairly hot water. Shellac varnish so made and kept in glass will not darken or blacken and answer every purpose.

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Gilding on Store Windows in Winter.

Use the same kind of size for laying your leaf as you do in warm weather, but see that your glass is first thoroughly rubbed with a solution of one ounce each of nitric acid and acetic acid in one-half pint of water, and then cleaned in the ordinary way with soft water and whiting, and when the whiting is dry, polish with chamois skin. When the gilding is finished and backed up in the usual manner and the work has dried hard, go over the whole with elastic varnish, running a little over the edge of the letters on the glass, which will keep the frost from peeling up the gold. To test drying, take a scrap of glass and try your size; if too heavy, the gold will appear spotted; when burnished with cotton, if too weak, the gold will rub off under the same treatment.

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Silvering on Glass.

When working out a formula do not be discouraged if the first or second attempt prove abortive, but sit down and think awhile, and perhaps you will find that there is one point or another which you have not thought of before and then try again. You state, for instance, that you warmed the plate glass to the temperature of the air. This is not sufficient, but your glass should be warmed through thoroughly; it should be at least 105 deg. F., otherwise the solution becomes chilled too rapidly, causing non-adhesion. You may have cleaned the glass with ammonia and then with alcohol, and yet it may not have been fit to receive the mercurial solution. Try again, giving the glass a first wash with aqua fortis, rinse with soft water, dry and rub with finest whiting and water, polish with chamois skin, then moisten with alcohol, dry with clean cloth, then warm as above.

— 200 —

Drier to Make Linseed Oil Paint Dry in from Three to Four Hours.

There are paint materials, such as white lead, burnt umber, etc., that impart drying qualities to raw linseed oil; others, that are perfectly inert, and again others that tend to retard the drying of the oil. In order to make linseed oil paint dry, the nature of the pigment that enters into the paint should be thoroughly understood, if it is desired to give it life, as well as drying qualities.

The simple introduction of a drier in the shape of a powder will not fill the bill. In order to obtain the full benefit of drying agents, they are usually introduced in the oil, while it is being boiled, and for this

purpose we have chiefly the lead salts and manganese salts, such as red lead, litharge, sugar of lead and lead borate, manganese dioxide, manganese borate, manganese sulphate and manganese oxalate. Strong driers in pulverized form are also offered to the trade, in the various resinates, such as resinates of lead and resinates of manganese, and safer driers in linoleate of lead and linoleate of manganese. By introducing a sufficient quantity of the resinates into boiling oil, such oil can be made to dry in a few hours, but the lasting quality of the oil will be shortened commensurate to the quantity of such drier. ,

Oil boiled with red lead or litharge will dry most thoroughly, while if boiled with the manganese salts, the oil or the paint in which it is used, unless spread in very thin film, is apt to dry superficially only, causing the surface to shrivel under certain conditions.

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Removing Old Wall Paper Without Destroying or Blurring the Pattern.

It was desired to remove from a room some wall paper over a century old, that was in good condition, as it was desired to save some of the paper without blurring the figures. Could this be done by closing the room and generating steam by having a kettle of water boiling in the room?

The method you yourself suggest appears to us the only feasible one, but we cannot say whether you have any show of success, as it depends very much upon the medium, with which this ancient paper was attached to the wall. Was it flour paste or was it glue, and how strong is the fiber of the paper? We would suggest that you first make a test on a small space on a panel, that you do not care so much about, bringing your steaming kettle fairly close, and if you succeed in loosening the paper here, you can assume that you can do it with the rest. We would also suggest that you also try to save the paper by direct soaking with water.

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Process Employed in Making Chipped Glass Signs.

While various processes, such as etching with fluoric and French acid and chipping by hand have been employed, the sand blast is now very extensively used for glass chipping and with far better success than is had by other methods, because it limits the area of the chipping and makes the edge of the chipped work sharp and definite in the outlines. The sand blast process is also used for grinding, frosting, incising, embossing and boring glass, as well as stone ornamenting, and in frosting or ornamenting various metals. That it is the only method for cleaning iron and steel from rust and mill scale is well known. Sand blasts are usually operated by a current of air, produced either by pressure or vacuum.

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Painting Cypress Lumber for Exteriors.

Lumber dealers claim that cypress will hold paint on exposed work equal to white pine, but one painter's experience shows it will not. He uses pure white lead, pure raw linseed oil and as little drier as possible. While on white pine this paint will remain in good condition for five or six years, on cypress the paint invariably scales in from eighteen months to two years.

We quite agree with you, as we have had a very similar experience in several instances. When the cypress wood is thoroughly seasoned, instead of being kilndried, better results may be looked for and then only when the priming is held less oily than is usually done for white pine. The builder or owner does not care for the protests of the painter, and if he objects too much, the other fellow, who does not object, gets the job. Instead of losing a job on that account, it is policy to make the best of it. See that the wood is at least fairly dry and make a priming of pure white lead in oil, thinned with equal parts of pure raw linseed oil and pure spirits of turpentine, adding to this as little drier as possible, so that the priming will not dry on top only and brush it well into the wood. The paint for the succeeding coat or coats can then be thinned with all oil and drier, and applied stout enough to cover. By following this method, the paint is not so apt to become scaly.

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Gloss in Oil Paint to Stand Exposure to All Weather Conditions.

Something was desired that could be added to a compound paint mixture to make a gloss that would stand outside exposure. Common varnish was tried, but was not satisfactory.

You do not state what the thinners in your compound paint mixture are, and therefore you keep us guessing while we could answer far more intelligently if you had told us whether you refer to an all oil paint or to a paint the thinners of which are composed of oil, turpentine and drier, or oil, benzine and drier, and whether you are using a saponifier to thicken the paint. In no case will the addition of ordinary varnish give you the desired result. If you want to make an oil paint that will keep its gloss for a fair length of time on exposure you must begin to build up to that end from the very beginning. You will have to thin your paste paint or colors in oil with a linseed oil varnish; in other words, a heavy boiled oil, kettle boiled with a minimum of drier only.

Many painters, especially when painting seashore and other exposed properties, after thinning their paint with oil in the regular way, add, for the finishing coat, a goodly portion of first-class spar varnish or outside varnish, obtaining lustre of fair durability, but this would scarcely be satisfactory to you because of the high cost.

— 205 —

To Prevent Zinc White from Becoming Yellow.

The yellowing off of zinc white on interior work may be traced to several causes, such as carelessness in dusting or cleaning of walls and ceilings, preparatory to painting, insufficient ventilation and the shutting out of light afterwards, the placing of furniture, etc., too close to the walls, but principally to the thinner used with zinc white, such as dark oil, dark driers, and the use of too much turpentine or the use of varnish that contains a liberal portion of oil.

To prevent discoloration it is necessary to have the room well dusted and aired and the walls, etc., well washed down with lukewarm water, to which a little soap has been added, rinsed with clear water and rubbed dry with rough, coarse sackcloth.

If you can afford it use French process zinc white ground in poppy-seed oil, and thin with pure turps only for flat work, but for eggshell gloss finish add one or two tablespoonsful of either poppy oil or bleached linseed oil for every two pounds of zinc, and in either case a dessertspoonful of white japan. If you use linseed oil, take it well aged and do not use the sunbleached article. You can age and bleach your linseed oil so that it will remain clear and pale by keeping it in open bottles or glasses in shady, airy places.

While the zinc coats are drying the rooms must be aired in order to allow the turpentine vapors to escape, and the more time for drying is allowed between coats, the whiter the job will turn out finally. It is well to suggest that furniture should not be placed against the walls until the paint has had a fair opportunity to thoroughly harden. For glosswork it is best to use zinc white that has been ground in damar varnish, and thin with a trifle of turpentine and bring it to proper consistency with pale damar varnish.

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Carbolineum Avenarius an Ideal Wood Preservative.

"Carbolineum was discovered by an officer in the Prussian Army in 1870 in his efforts to produce a compound which would preserve the vineyard stakes in the Rhine valley from decay. R. Avenarius, the original inventor, has since made many valuable improvements and patented the same in all parts of the globe, and very favorable reports of its efficiency as a preservative of wood from dry or wet rot have been made to the Imperial Government of Germany, as well as by the United States Department of Agriculture. From these reports it appears that it is adapted for the impregnation of wood subjected to dry or wet, as well as where dryness and dampness alternate, and that it is much more effective than liquid coal tar and more economical in the long run, as one gallon will cover 25 square yards of rough timber, and because it is a powerful disinfectant as well. The American Architect and Building News says of the compound: "It has for its basis the best and purest heavy coal tar oils, or dead oil, to which are added other powerful antiseptics, including that most powerful of all, chlorine, which induces such chemical changes in the crystallizable constituents of the dead oil as greatly to add to its efficiency

and penetrability, making the liquid self impregnating and dispensing with the expense of a plant and machinery and the transportation of the lumber." It may be well to add that in cases where the timber is kiln dried and for parts that go under ground, the carbolineum must be applied hot in order to make it penetrate more deeply, while on the parts that remain above ground in warm weather on air dried lumber the cold compound may be employed.

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What is White Ocher in Oil?

We do not know what white ocher should be, as we never heard of such a pigment or saw it advertised in the lists issued by paint makers as an orthodox paint. China clay, among the white pigments, is the nearest approach to ocher, so far as its chemical constituents come into the question. But it is well known that China clay has but little covering power as an oil paint, and therefore it must be taken for granted that white ocher is the misleading commercial name for an inferior white paste paint, on the label of which no manufacturer of repute will have his name appear. So far as we have learned, these so called white ochers are mixtures of barytes, terra alba, marble dust or whiting, with a very small portion of zinc white or lead or both, so as to give the paste whiteness, and may be classed with the lowest class of fake lead brands, which no sensible painters will touch. It will not take many years for him to find out what a mistake he has made in priming with such trash, no matter how good a paint he has finished with, and we would advise him to leave it severely alone in future.

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Enameling a Brick Wall, Laid in Cement, for an Engine Room.

It is required to paint in oil color, or possibly enamel, the inside brick walls of a recently built engine room.

As you cannot wait for the cement in the joints to lose its possible caustic properties, it will be best to make a solution of 12 fluid ounces oil of vitriol to one gallon of water, and with this saturate the cement in the joints thoroughly, allowing the cement to become dry again, when a white porous crust will form, which should be coated with pure raw linseed oil until suction is fairly well stopped. If, however, the cement is over a month old, a solution of four ounces of bicarbonate of ammonia in two gallons of water may be used in place of the dilute oil of vitriol which will prove more effectual and time saving because in that case the wall may be primed as soon as the joints have dried again. A trial will prove whether the joints are more absorptive than the bricks, in which case the joints should be coated to stop excessive absorption before the wall is primed. For priming we would recommend an oily white lead paint with a moderate quantity of drier. If enamel is wanted as a finish, the second coat should be held less oily and the third coat nearly or quite flat. For the enamel we would suggest French zinc in damar varnish, thinned with a pale enamel varnish, tinted to suit. If every coat is allowed to dry hard before the next is applied there will be no great risk of the heat affecting the

enamel. But while the work is being done the temperature of the room should not be below 70 deg. F.; rather warmer, if possible. In selecting the varnish for the enamel care should be taken to avoid the use of one that is liable to soften under the influence of heat.

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How to Keep Iron Nails from Rusting in Wood on Exposure.

Heat the nails to a cherry red and throw them quickly into a pot of raw linseed oil, drain off the oil and let the nails become fairly dry before use.

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Baking Enamels and Colored Lacquers.

Information required about baking enamels and colored lacquers for toys of steel, wire and cast iron, which are to be dipped and then baked.

You can obtain sufficient heat by introducing into your oven a set of steam coils, because you do not require more than 220 deg. F. at most, and the size of your steam coils should be in accordance with the size of your oven. Exhaust steam will serve the purpose, providing the size of the pipes is large enough and a small jet of live steam is also provided for, to be used in addition in case of necessity. Time required for baking is anywhere from four to twelve hours, according to the drying qualities of your enamel or lacquers under that process. As for the enamel in white or tints, the best base is French zinc, ground in damar varnish, which may be tinted with colors to suit, then thinned with spirits of turpentine, to which a good pale baking varnish is added to give the required luster. For dipping, this baking varnish must be short, so as to drip freely. For colored lacquers anilines are employed, which are soluble in oil or turpentine, and these, when dissolved, are added to the lacquer. To meet with success in the preparation of these enamels and lacquers means a long and tedious experimenting, and we should advise you to look over the advertising pages of this magazine and correspond with the paint and tedious experimenting, and we should advise you to correspond with paint and varnish manufacturers who no doubt can assist you by supplying any material you require. As to handling the articles in dipping and conveying the same to the oven, the best method will be gained by trial. As we do not know the shape of the articles, we cannot advise you on that point, but would say that the paint or lacquer must have been well dripped before the article is put into the oven, because clots of paint cannot bake on, and would look badly even if they did.

— 211 —

The Cause of Livering of Colors in Oil or Japan.

Our space is too limited to give in detail all the causes that lead to this very bad feature, which makes paint not only difficult to prepare for spreading, but in most cases utterly worthless in point of durability. It will suffice to say that the principal cause for the livering of paste paints or colors is moisture in the pigment or in the oil, together with an overheating of the mills. Next, the presence of resinous matter in the vehicle that is used with a pigment containing lead base.

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A Paperhanger's Size That Will Not Sour.

The following size for walls that are to be papered is highly recommended: One pound of white sheet glue is soaked in enough water to cover it over night; then two gallons of boiling water and one-half gallon of wood naphtha (wood alcohol) are added and the whole material well mixed. This size will not sour under any conditions and the paper that is applied over the size may be varnished. To make the size so that it will retain a tack add a small quantity of pale syrup. The glue should be genuine and not mixed with starch or white clay. If the size is for walls that have been whitewashed it should be applied warm, so as to penetrate thoroughly through the coating of whitewash in order to bind it securely to the wall.

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To Prevent Ceiling Paper Parting on Canvas.

The best way to cover a ceiling with muslin is to use good strong muslin; have it sewed together in one piece and tack it on one side first, using six-ounce tacks; then on one end and so on, taking care to pull it fairly tight, until the remaining side is tacked on. The muslin should invariably be sized before papering, because paper pasted on muslin so prepared will not part.

— 214 —

The Difference Between Benzine, Gasoline and Naphtha.

There is quite a difference between the products sold under the names mentioned. Benzine, or petroleum spirit, is one of the products obtained by the distillation of crude petroleum, by which three products are had, namely, naphtha, kerosene and residuum. The naphtha is treated with sulphuric acid to refine it, then washed with caustic soda, which treatment produces gasoline and benzine.

Gasoline is a very light, water-white spirit, of very light specific gravity, ranging from 0.680 to 0.700, weighing $5\frac{1}{4}$ pounds to the gallon at a temperature of 60 deg. F. It is used as fuel for gasoline stoves and lamps, and in chemical laboratories for extracting the oil from pigments, and for other special purposes. It is sold in commerce as 72 deg., 75 deg., 78 deg. gasoline, and very often by paint dealers to painters in place of benzine. While it makes a good brush cleaner, it should not be used in paint as benzine, for the reason that it is even more volatile and more inflammable.

Benzine is less volatile and has a higher specific gravity; 65 deg. benzine has a specific gravity of 0.724, while 62 deg. benzine has 0.732 and 58 deg. benzine has about 0.750, but 62 deg. benzine is what is generally used, and weighs six pounds to the gallon at a temperature of 60 deg. F. It is a limpid, water-white liquid, which, if well deodorized, has not a disagreeable odor, and a drop placed on a sheet of white paper should evaporate, without leaving a stain, in from two to three minutes. In paint it is much to be preferred to turpentine, that has been adulterated with kerosene oil, unless used in excess. In the West

benzine is usually known as naphtha, or naphtha, which term is really a misnomer, because naphtha is a heavy oil, whether it be derived from petroleum or from coal tar.

Naphtha proper may be coal tar naphtha, solvent naphtha, burning naphtha, derived from the distillation of coal tar, which yields an oil known as dead oil, then a dark brown spirit, known as naphtha or light oil, with a specific gravity of 0.900, or $7\frac{1}{2}$ pounds per gallon, on an average, with a characteristic coal tar odor, that is anything but agreeable. From this oil the coal tar benzols are obtained by redistillations, treatments with sulphuric acid and washings with caustic soda. The various products are sold as 50 per cent., 90 per cent. or 100 per cent. benzol, and are powerful solvents for rubber, etc. These benzols will mix readily with other solvents, and are good solvents for oils, fats, resins, and really the only effective solvents for coal tar pitch and the residuum of oil stills, and are more volatile than turpentine, without leaving any residue. For use in ordinary paints it is not practical, on account of its high cost and because the ordinary benzine will serve as well.

— 215 —

Finishing a Bathroom With Aluminum Paint.

The walls should have an eggshell gloss finish if the bronze is to be used over all of the walls. You do not state whether you are to cover all with aluminum or only ornament with same. At any rate, an eggshell gloss finish will be best. As it is for inside work, you can use either a slow drying bronzing liquid, which you can purchase prepared or prepare it yourself by thinning a good coach varnish with benzine to a consistency that will make the bronze work out smoothly and freely from the brush. Or if you want to make a quick job, dissolve white shellac in methylated spirit and amylacetene, equal parts, and add a little fusel oil to make it work freely. The principal point is to work quickly and avoid laps.

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Luminous Paint for House Numbers.

In answer to a question on the subject, we have the following from a very responsible source:

Numbers simply painted on a house with luminous paint do not amount to much, because they soon collect dirt; but if the numbers are left white and the ground work filled in on a piece of glass, and then backed up with luminous paper and properly put in a frame, to protect the paper from the rain, they will remain good for an indefinite number of years. Such frames are now on the market as a regular article of commerce, and can be had at quite reasonable prices.

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Blistering and Scaling of Paint on New and Old Work.

In building an extension to a residence, the builder took off some old clapboards that had been painted with four coats of paint, using them along with the new clapboards on the extension. A painter was em-

ployed by the owner to give the entire extension two coats of paint. four weeks later the paint was found to be full of blisters, and the owner refused to make a settlement. On the old clapboards the paint could be taken off in large shreds clear to the bare boards.

The defect you mention can be traced only by a full knowledge of the condition of the surface at the time when you applied your paint. The reason why you were able to take off the paint on the old clapboards in shreds is more readily explained than the cause for your paint blistering on the new part of the work. On examining the scales or shreds of paint you have sent us, we find that the original priming coat consisted of ocher or nearly all ocher, and invariably, when an ocher priming is applied too heavy or when such priming is fatty, it splits and causes scaling clean to the wood. Now the old paint may have been loose, without being discovered, when you applied your paint or the contraction in the drying of your paint may have loosened the old film, or moisture from inside may have caused it to loosen its hold on the wood. At any rate, it is evident that the old paint had a very poor hold on the boards. As to your paint blistering on the new clapboards the cause may be traced to green lumber or to dampness in the wood, caused by rain and thought to be dry enough to paint on, or by the drying out of the plaster striking through, especially when the room is heated to aid in drying the plaster. If you will think awhile, you can most likely remember to which of the causes mentioned the blistering of your paint may be ascribed. If the owner is not satisfied with your explanation, submit it to arbitration, so long as you are certain that it was no fault of yours.

If, however, your paint on the new woodwork has not blistered and is intact, it is very plain that the trouble is due to the old paint on the clapboards, and you are not in any way responsible for the failure.

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Filling Cracks in Plastered Walls and Preparing for Painting.

If cracks or holes in plastered walls have been filled by the plasterer, the plaster consists generally in part, at least, of fresh lime. In this case soak the new plaster with strong vinegar and let it dry after giving it all the vinegar it will absorb, then go over the same places with a size made of two parts linseed oil, one part turps and one part japan, and when this is dry and hard, put on a thin coat of white shellac varnish over the whole wall before painting.

When the painter is obliged to fill cracks in old walls that are to be repainted, the safest way to proceed is as follows: Cut out the cracks in the shape of a V and level the edges, then after cleaning out the loose plaster or sand, mix some fine plaster of paris with thin glue size and fill up the cut-out cracks with this material to within an eighth of an inch of the surface and let it become dry and hard. Now paint over the filling and the edges of the crack with a fine pointed brush and let this dry, then level up with white lead putty, which is made by mixing dry white lead with coach japan and as much glazier's putty in bulk, as there is of white lead and japan. When this has dried hard take a block of wood and sandpaper, and smooth down the filled portion, so as to bring it to a level with the remainder of the wall. This

done, the sandpapered portion should be given a thin coat of paint to match closely the old paint. If the wall has not been painted before, this coat of paint should be white. Treated in this manner, cracks will not show through.

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Testing the Comparative Value of Soap.

Carefully weigh a piece of the soap to be tested, cut it into thin chips or slices, then place it into soft water to which has been added a handful of ordinary table salt, set the pot on a slow fire until it comes to a boil. Keep boiling until all the soap is dissolved, then set away to cool. The soap will eventually separate from the water, is then collected, allowed to dry and reweighed. The loss in weight represents the amount of foreign matter present in the soap. Following this method with various brands of soap will determine which brand has the most value. It is self-evident that it is the one that contains the least foreign matter.

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To Cure Damp Walls in Basements and Cellars.

A cure was wanted for cellar walls that have become moldy from dampness.

You do not state the cause of moisture nor the condition of the walls, whether they are rough or smooth plastered, cemented or in the crude. However, we can give you one of the latest methods, which is said to be very successful as a cure for dampness and mold. If at all possible, a portable furnace is placed in the cellar or basement and a fire kept therein for at least 36 to 48 hours, while the place is ventilated as much as possible. In the meantime 93 parts by weight of finely powdered brick dust are intimately mixed with 7 parts by weight of fine litharge, and this mixture made into a stout paste with pure kettle boiled linseed oil only. This paste is allowed to stand at least a day and then thinned with more boiled oil sufficiently to make it applicable with a stiff brush. It will take from three to four days to dry hard, when a second coat may be applied, if thought necessary. The use of volatile thinners and japan driers, however, must be avoided in this paint material, and both the brick dust and litharge must be bone dry before they are mixed with the oils.

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Durable Polish for Hard Wood Table Tops.

The very best polish for the purpose is cold pressed linseed oil. This is applied with a soft linen cloth which is rolled together in bung shape, and rubbed uniformly hard and in even strokes, until the top has assumed a mirror-like surface. If the polish has been long neglected it may be necessary to keep on rubbing for hours, but it is the only sure method to obtain the effect you desire. As it is next to impossible at this time to obtain cold pressed linseed oil for love or money, we would advise you to employ in its place the ordinary hot pressed raw linseed oil, selecting some that has been well settled and clarified by age.

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Split Glass Signs, or Frosted Glass.

Several years ago a new industry was started in Paris, France, that of producing hoar frost glass, which is covered with feathery patterns resembling those naturally produced on window panes in frosty weather. The glass is first ground either by sand blast or the ordinary method, and then covered with varnish. This varnish contracts strongly on drying, taking with it the particles of glass to which it adheres, thereby producing the branching crystals of frost work. One single coat gives a most delicate effect, while several coats yield a bold design. A more simple method, however, is followed in this country. The glass need not be ground in advance and instead of using varnish, ordinary glue is employed, which, in drying, splits off irregular patches of the glass surface in the most surprising manner, giving rise to most charming frosted effects of infinite variety. Where "flashed" glass is used for the purpose (that is, a colored glass, having a superficial thin layer of colored glass on one side), the effect of the tearing loose of the colored layer in some places and not in others enhances the beauty of the resulting frosting.

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Touching Up or Renovating Blackboards on Plastered Walls.

By all means wash down the surface with strong vinegar first to remove all grease and rinse with clear water, using a sponge. When dry, touch up all the worn spots with lampblack, thinned with turpentine and a little japan. Then give a good coat of drop black in japan thinned with turpentine, to which a tablespoonful of rubbing varnish for every pint of the thinned material has been added, and when this is dry and hard, apply your liquid blackboard slating. If you desire to make a quick liquid slating, dissolve one pound of orange shellac, dry, in one gallon of 95 per cent. alcohol, into which stir one-half pound finely powdered ivory black and one-half pound finest flour of emery and mix well. When using the slating stir frequently and apply quickly with a fine, flat brush. If too stout to work without brush marks, thin with more alcohol and when not in use, cork up tightly.

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The Composition of Gloss Oil and Its Uses.

Gloss oil is a term largely applied in the South and West to a mixture of ordinary rosin and benzine. Its manufacture is very simple and it may be done in the cold way by powdering the rosin and stirring it into the benzine (or naptha, as many are wont to call it), until it is dissolved, or the rosin may be melted in a kettle over a fire, then removed to a safe distance and the benzine poured into the kettle, under continued stirring. This rosin and benzine varnish or gloss oil is mostly employed for thinning very cheap paints, such as are used for coating barrels and other work where quick drying is required, but durability not looked for. It could be employed for sizing walls, but we should not advise you to use it because it is almost

too brittle and you had better not depend on its use as a wood filler, even for very cheap work. For these purposes you should have a varnish that is prepared with a fair percentage of linseed oil, even if it should contain rosin and benzine as its other constituents.

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Papering on Fresh Walls Over a Size of Rosin Oil and Benzine.

A new house, plastered with lime and sand mortar, had been warmed for four or five weeks, when the painter papered several rooms and the hall, using rosin oil and benzine size. The paper came off in a short time and he went over the old size with a weak solution of glue and water. A week later the paper again came off, and the owner applied to another painter who was at a loss how to proceed..

You have a difficult problem before you, and we do not wonder that you will not risk undertaking the job. Rosin oil and benzine is the worst material that could have been applied as a size, because even after the benzine has evaporated, the oil will remain tacky, even though apparently hard and the warm temperature of the house will keep it so. We would advise you not to undertake the job at this stage and give a guarantee, but do it at the risk of the owner only. It will be an uncertain undertaking to remove the rosin oil from the pores in the plaster, but you might try a solution of caustic soda or concentrated lye. Sponge the walls with this, then rinse with clear water, then let dry thoroughly, after which apply your regular paper hangers' wall size. In using the soda solution wear rubber gloves to protect your hands, and use a swab made from cloth or waste tied to a broom handle, and let the solution remain long enough to act on the rosin oil. This is all the advice we can give you on the subject.

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Making Cheap Mixed Paints Ready for Use.

There are many ways and means to cheapen paint, either by extending the pigment or by employing cheaper thinners. It is not advisable, however, to employ any but orthodox materials, such as pure white lead, linseed oil and turpentine for priming new woodwork in house or sign painting. It is better by far to make use of cheaper material for finishing coats, than to believe, as many painters honestly do, that anything is good enough for priming. This theory is on a par with the building of a house on sand. A brittle material will not suit for priming, because it will surely be thrown off after successive repaintings, if not after the first operation. See our suggestions in Section 28 on "Cheapening of Paint Material," and in Section 86 on "Cheap Paint for Rough Work." White lead paint can be cheapened as a pigment by the addition of bolted whiting or the thinners may be cheapened by substituting benzine for turpentine, or by adding alkaline water solution to the mixed paint. As to our opinion of the value of benzine as a substitute for turpentine would say that if benzine is used moderately and in smaller quantities comparatively, there will be no perceptible effect on the durability of the paint, but we do

not want to put ourselves on record as advocates of benzine as a substitute for spirits of turpentine. It is a matter of dollars and cents, and we cannot blame the painter for using benzine wherever he can in place of the much higher priced article. All in all, as benzine evaporates completely in the drying of the paint, it is far less injurious to paint than the use of adulterated turpentine or of non-drying mineral oils. As to employing water in oil paint we think that its use is injurious only when the amount of water used is out of all proportions to the quantity of linseed oil. A small percentage of water will evaporate on the drying of the paint, and it will keep the paint in fair suspension and will keep it from running or sagging during the application.

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Filling for Letters in Brass, Zinc and Copper Signs.

The cement or filling for the letters of metal signs is made by mixing intimately equal parts of asphaltum, shellac and lamp black. The asphaltum and shellac must be powdered, and the mixture is applied by heating the plate and melting in the cement, smoothing it off with a warm iron. Scrape off the surplus carefully and hold a warm iron over the letters to glaze their surface. Black sealing wax will also answer the purpose of filling in, and the treatment is similar. If the signs cannot be heated, make a putty from dry lamp black, asphaltum varnish and brown japan and fill the spaces, pressing the putty well in with the putty knife, then clear the edges with turpentine. When the filling is dry, polish the whole plate.

All the ingredients given are to be dry; the asphaltum and shellac are powdered and intimately mixed with the lampblack, and the mixture is melted into the letters by heating the plate. When well filled and cooled off, after removing surplus, the cement is smoothed with a warm iron and the plate polished.

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Gilding on Glass—How to Do It Properly.

It is an easy matter for us to tell others how the work should be done, but a more difficult matter for others to do it without a good deal of practice. However, we shall endeavor to explain to you the method by which others do the work successfully.

Your attention is first called to the proper preparation of your size, which may consist of a solution of gum arabic, isinglass or white sheet glue. For the gum arabic solution dissolve one-eighth of an ounce of gum arabic in one pint of boiling water, filter through blotting paper or regular filtering paper, and when cold add a teaspoonful of pure white whiskey to keep from molding, and when placed in a bottle well corked it will keep for many months.

A still better size, but more troublesome to prepare, is that made from isinglass. Take a piece of isinglass the size of a nickel and dissolve it in a pint of boiling hot rainwater, which must be heated in a perfectly clean pan to avoid grease. If any scum arises during the boiling or dissolving process, remove it with a spoon. Filter the solu-

tion through white blotting paper while hot and allow to cool, when a tablespoonful of alcohol may be added to take out any traces of grease that may still be there. This will also keep for a long time if kept in a well corked bottle. While we consider this the best size for glass gilding, would say that if isinglass is not handy a piece of clear white sheet glue, about the size of a silver dime, may be taken in place of the insinglass and treated in an exactly similar manner. The principal point about the size is to have it free from grease and to allow it to stand for at least twenty-four hours before using.

Next important is to see that the glass is pure, for on inferior glass good work cannot be done. If the glass be greasy, wash it with a solution of one ounce each of nitric acid and acetic acid to one-half pint of soft water. Allow this to remain on the surface about five minutes, then clean the glass with soft water and whiting, and polish the side on which you intend to work with tissue paper. Now lay your punctured design on the opposite side from that on which you intend to work and apply the size freely with a camel's hair brush or spalter, and with a tip lay on the leaf as smoothly as possible, allowing it to protrude over the edges of the design and permit the whole to dry, then burnish with raw cotton. Rub briskly to obtain good luster, no matter if some of the gold rubs off, then apply your size for the second layer of gold, but not as plentifully as at first, and lay on the leaf as before. When dry, burnish again and then go over the work to patch up, wherever there is only one coat of gold, by dampening such patches with the edge of the brush and laying on small pieces of the leaf, and this dry, burnish lightly. If a spotless surface is desired, wash it several times with the size. When dry, it is ready for the design, which is now laid right side next to the gold and the outline of the letters pounced on with a pouncing bag filled with whiting or Venetian red. The backing up may be done with asphaltum varnish or rubbing varnish mixed with lamp black and thinned with turpentine, the latter being most permanent. When the backing is perfectly dry, dampen a small bit of cotton and rub off the surplus gold, then shade your letters backward, laying on the darker shades first, then the lighter ones and the background last. Before beginning to work, test your size on a scrap of glass; if your size is too strong, the gold leaf will appear spotted; if too weak it will rub off too easily when burnishing.

To keep gilding on glass from early destruction by frost or repeated scrubbings, go over the whole with a good elastic varnish.

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Paint for Rough Cast Surfaces.

If the walls have stood for some time, say at least one year, and first cost is no obstacle to its use, we would recommend a pure lead and linseed oil paint, white or tinted to suit, the first coat to be quite thin and oily, the second coat as stout as it is used for a finish on woodwork. Should this be too expensive to suit your patron, you might use either of the following: Take fine sand that has been washed and dried and mix the same with a similar quantity of Portland cement (best grade) in water to a fairly thick consistency, then add for a red tint enough Venetian red, for a yellow tint pale French

ocher, for a greenish tint terra verte, for a gray tint lamp black, for a bluish tint ultramarine blue, and strain through an ordinary sieve to break up any lumps that may have formed. Finally, thin the mixture down with water to the consistency of a thin oil paint and apply cold with large wall brushes. The wash must be kept well stirred while being used. Should the color be too dark, add some slacked lime or ordinary whiting, but be careful to use mineral colors only for tinting, because of the probable causticity of cement and lime.

If it is in any way convenient for you to apply a warm paint we would suggest the following wash, which has been tried by the writer with excellent results: Take a fifty-gallon barrel and place therein one-half bushel of builders' lime, fresh burnt, over which pour hot water, say about ten gallons, and cover tightly to keep in the steam while slaking. Let stand covered over night, then strain the liquid through a fine sieve into another barrel and add seven pounds of common salt, previously dissolved in hot water. In the meantime cook three pounds of rice flour in hot water to a creamy paste and add this while hot, always stirring well. Five pounds of bolted whiting are also mixed with soft water to a thin paste and added to the liquid. Finally one pound of pale glue that has been soaked in water over night is boiled as usual in a water bath and thinned with boiling hot water to make five gallons of liquid glue, which is put in with the other. Stir well and if the total does not amount to thirty gallons, add enough hot water to make that quantity. Let the barrel stand covered for several days more, when the wash is ready for use. The wash must be applied fairly warm, therefore it is necessary to have the pots from which the paint is used standing in hot water during the operation. Two coats of this wash will stand out white on any surface, and it may be tinted with mineral colors as in the case of the cement wash. It is the most durable and economical coating for brick or rough cast walls that we know of, and has been in use for 100 years or more on lighthouses and other buildings in the United States.

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Black Ink and Water Colors for Show Cards.

The ink mentioned in recipe, Section 109, is made from the dry material, the shellac which may be doubled, acting as the binder, the white soap and wax as the vehicle. When used it should be moistened with alcohol, but only sufficient to make it flow from the pencil.

To prepare water colors for show cards, first moisten lamp black, bronzes and all colors that have a light specific gravity with alcohol, then mix intimately with water to which a little dextrine has been added. The dextrine should be dissolved first. A trial will readily give the proper proportions. The heavier pigments, such as white lead, zinc white, chrome yellow, chrome green, vermilion, etc., do not require treatment with alcohol. The so-called distemper colors, i. e., colors ground in paste form, may be mixed directly with a weak solution of dextrine in water. Liquid glue may also be employed as a binder, but we prefer the dextrine solution, because it flows more freely from the brush and the color mixed with it does not dry up so rapidly on standing about.

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Preparation for Cleaning Wall Paper.

The following has been suggested by the Pharmaceutical Era: Mix together one pound each of rye flour and wheat flour into a dough, which is partly baked and the crust removed. To this add by kneading one ounce of common salt and one-half ounce of powdered naphthalin and then one ounce of cornmeal and one-eighth ounce of finest burnt umber. This composition is formed into a mass of proper size to be held in the hand, and in use should always be drawn only in one direction over the paper to be cleaned. A more simple method is to tie up two quarts of wheat bran in a coarse flannel cloth or a bag made of flannel, and rub it over the paper briskly, all in one direction, taking care to miss none of the space. Before rubbing, however, the walls or ceiling must be carefully dusted.

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Simple Test to Detect the Presence of Mineral Oil in Linseed Oil.

Take a strip of ordinary window glass and paint it on one side with a dense black. When dry turn the painted side down and place on the unpainted side a few drops of the suspected oil, and alongside of this a few drops of linseed oil which you know to be pure. If adulterated with any kind of mineral oil, with even as little as five per cent., the bluish cast or bloom will be noticeable to such an extent as to cast aside all doubt.

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How to Make Varnish for Wagon Work.

This is a difficult proposition. We can give you formula for making good varnish for wagon work, but we cannot teach you how to make it. In the first place we doubt whether you have the necessary apparatus to make it successfully, and in the next place, it takes quite a little experience to make it properly. Therefore we should advise you to buy your material from reliable manufacturers, as in our opinion it will save you much vexation, annoyance and money in the long run. You cannot buy your gum, driers, oil and solvents at as low prices as the manufacturer, and you might spoil many a batch before you would meet with success, to say nothing of the costly apparatus required for the purpose, and the attendant fire risk in your shop.

To give you an idea of the very simplest way to make a wagon varnish that will dry, say in twelve hours in winter and about eight hours in summer, will say that you require two transportable kettles which can be removed quickly from the fire, in one of which to boil the drying oil, in the other to melt your gum. You also need at least one thermometer that is incased in metallic tubing and which is very costly. Each kettle should be provided with lids, which have small openings for the insertion of the stirring rod or paddle, and for the introduction of material without the necessity of removing the lid. In one of the kettles, say twenty gallons of well-settled linseed oil heated to say 280 deg. C. (506 deg. F.), and while being kept at this tempera-

ture three pounds of litharge is gradually introduced under constant agitation, until the litharge is pretty well taken up. This requires several hours. In the meantime 100 pounds of copal (either Kauri Gum or Angora Copal) is melted in the other kettle, great care being taken to keep from taking fire, keeping the melting portions of the gum well under the portion already liquid. When the whole mass is liquid the kettle is removed from the fire and under constant agitation the hot drying oil is introduced and the mixture again put on a somewhat slower fire and allowed to simmer for a while to body up. Now the kettle is again removed to a safe distance from the fire and quickly thinned, while stirring, with about seventy gallons spirits turpentine. When nearly cold it should be stored in a tank in a warm room to permit it to settle and clarify by age.

This is only one of many methods, but it will give you a fair idea that in these days of sharp competition the varnish manufacturer does not make such an enormous profit, after all, and that only by improved apparatus and manufacturing on a large scale he is enabled to sell varnish at present rates.

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Method of Finishing Furniture in a High Polish.

We assume that you have hardwood furniture in view, and would say that the first step is to see that the work, as it comes from the cabinet makers, is well sandpapered, for if it is not it will have to be done by you in order to have a good surface to begin with. In case the furniture is to be stained, this is the next operation, after which comes the filling with a good paste filler. This dry, sandpaper again, but always with the grain, using 00 or 000 sandpaper, after which dust off carefully and give a coat of shellac varnish, over which apply furniture rubbing varnish, two coats if you can afford it. To make a very good job, three or four coats may be required. When the last coat of rubbing varnish is dry and so hard that the finger nail will not make an impression, rubbing may be begun, but not before.

The rubbing is accomplished by applying rubbing oil (crude petroleum is best), to the surface, sprinkling powdered pumice O or F on the same (if the work is horizontal), and rub with rubbing felt in long strokes with the grain of the wood. When sufficiently rubbed clean up the oil and pumice quickly, and be very particular about moldings and corners. Fine sawdust that has been dampened will serve very well to take up the oil and pumice, but to make doubly sure the surface should be gone over again with cotton wadding. For a first-class polish apply one coat of cabinet finish and when dry rub down with F. F. or flour of pumice and rubbing oil, clean off very carefully, then, with a piece of chamois skin dipped into rotten stone, rub the surface with a rotary motion. Let the rotten stone dry on the surface, then with the palm of the hand wipe off the rotten stone, keeping the hand in rotary motion, and wipe the hand off on a cloth after each stroke. We cannot recommend any particular brand of varnish for the purpose.

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Painting a Locomotive.

It is impossible for us to give you an idea as to the price you should ask for the job, as you do not state anything about the size of the locomotive, nor of color, ornamentation and lettering desired. Engines are not usually coated at present with black asphaltum varnish, but higher priced goods, such as black or green locomotive enamels, are now very generally used, or flat color is applied, then a coat of locomotive rubbing, which is mossed down and finished with a high class locomotive varnish. Engine cabs are usually painted green outside and a deep red inside. The tenders may be painted any color specified, but engine, cab and tender always show a high gloss and must of necessity have a hard surface, so as to make cleaning comparatively easy, wherefore oil paint would not be serviceable. Each railway system have their own methods and specifications, so, you see, we are at a loss to answer you intelligently. However, from reports of the Master Car and Locomotive Painters' Association we learn that the average cost of painting a locomotive is \$68.68 for passenger service, and \$59.88 for freight service, taking the reports from ten roads as the basis.

As to repainting the locomotive in question we do not see that it is necessary for you to burn off the old paint from the cab and tender, if it can be done with scrapers, or still better, with a mixture of concentrated lye and lime plastered on and then scraped off. You can give the surface a lead coat, and then knife on your rough stuff or surfaces, rubbing down with pumice brick, one coat of flat color and one coat of color-and-varnish, on which the striping and lettering can be done, and one coat of finishing varnish. The inside of the cab can be washed down, a coat of color-and-varnish and one coat of varnish over this. For the locomotive tank, enamel black or Brunswick green enamel and one coat of locomotive finish will suffice. For front part of locomotive, lampblack and oil answers best, and for the trucks oil color is usually employed.

You must obtain the details in order to build up your estimate, and you must remember that locomotives are painted at a cost of as low as \$45.00, though the surfacing is very poor and little ornamentation is apparent on the engines of that road. The highest cost given is \$113.53, but this engine presents a mirror-like finish, and is highly ornamented and lettered in gold.

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Cement for Plaster Figures or Ornaments.

An attempt to cement together alabaster or plaster of paris ornaments with plaster of paris and water did not hold.

Your plaster of paris cement did not have enough binder to hold. Take two parts by weight of Portland cement, one part slaked lime, dry, and one part fine sand and mix with silicate of soda (water glass) 33 degrees. Beat to a mushy consistency, apply to the fractures, press together, remove the surplus cement that squeezes out, and tie the parts together, if necessary. Will harden in less than twenty-four hours and will not part again.

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To Clean the Caned Seats in Chairs.

Turn over the chairs, and with sponge and very hot water rub off the caned part. See that the cane takes up all the water possible, then place the chairs in free air or in a well ventilated room to dry, when the seats will look like new and may be coated with white shellac varnish.

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Best Putty for Glazing Hothouses.

The very best putty we know of for the purpose mentioned is to boil paint skins with linseed oil until they become so soft that they may be put through a paint strainer and give a fine gummy paint of fairly stout consistency. This paint is mixed with bolted whiting and powdered litharge, ten parts of the former to one part, by weight, of the latter, until it is of the consistency of soft putty, when it is laid on the frame with a putty or glazier's knife and the glass imbedded therein. More whiting is used to stiffen this putty for the final application, which is effected in the same way as in ordinary glazing. Commercial linseed and whiting putty is not durable for glazing hothouses, because of the action of the moisture within and that of the sun without. The preparation named will answer where the framework is iron, as well as on wood.

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Gold Tarnishing on Smalted Sign Boards.

On two smalted board signs the gold leaf tarnished in one year to look like brass. The boards had three good coats; the size was from oil the painter had used for six or eight years, and the gold leaf came from a first class house.

You forgot to state what color the smalts were, nor do you mention the quality of the smalts. The firm you buy the gold leaf from is first-class in every respect, but we have come across instances where gold leaf has changed to the color of brass or copper in less than a year's time. This may be caused by a smoke laden atmosphere containing sulphur or from sulphur in your smalts. The copper alloy in the gold has something to do with it, and we should advise you to wash off the gold with weak sulphuric acid and it will look like new. Take commercial sulphuric acid and soft water, equal parts, and use a sponge tied to a stick to apply it.

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Removing Cracked Paint From Exterior Surfaces.

A better method than burning off was wanted for removing paint that had cracked so badly as to show an alligator skin, and in some places inclined to peel and even curl. The house had been painted with two coats of pure lead and linseed oil, but was then in bad condition, having been painted four or five times before with not less than 50 per cent. of zinc oxide in the paint.

You cannot make a lasting job of repainting the house in question unless you remove all of the old paint that is loose or otherwise clean to the wood. And you will find it most economical to use the torch and burn off the paint, because in the hands of the skilled man the torch will do the work in less time and with less expense than by employing a paint remover. A good and effective paint remover is all right where the torch cannot be used or where the surface is to be in the natural finish again, but for large surfaces that can be readily got at with the burner, our experience favors the latter plan of procedure.

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How to Prepare a First-Class Floor Paint.

To make such a paint successfully, the pigments required to produce the necessary color or tint of the paint must be considered, also whether the paint is intended for interior work only, or for porches as well. If for interior work only, zinc white may be used as the base for tints, but for porch floors zinc white should be omitted, or its use should be minimized, and white lead introduced as the base.

The white lead or zinc white and oil colors should be well ground and of pasty consistency and thinned to liquid form with pure turpentine and, as the drying characteristics of the colors may require, with a fair portion of japan or liquid drier, and to this mixture should be added a good, hard drying twelve-hour floor varnish to produce the necessary gloss and give binding properties.

It is impossible to give any fixed rules as to proportions, and the painter will have to work out his own formulas and select his materials by making his own experiments and tests.

We can only add in conclusion that by taking the strongest colors obtainable, less pigment will be required to make the paint cover properly, and such paint will work more freely and evenly under the brush, and it will be more elastic, hence more durable, than a paint with an excess of useless pigment. It is also self-evident that when such inert pigments as ocher, Venetian red or zinc white are employed a greater portion of drier is required to make the paint dry hard within the limit, than when drying pigments such as white lead, burnt umber, etc., enter into its composition. Under certain conditions to insure thorough drying, it may become necessary to use color, ground in japan, as, for instance, when Vandyke brown is used as coloring matter.

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Refinishing Oak Doors and Sash.

Take off doors and sash and lay them horizontally on trusses, give them a coat of wood alcohol, which will soften the varnish still remaining. Now take sharp steel scrapers to remove the softened material and repeat the operation until you get close to the wood.

Now take a solution of oxalic acid, say one-half pound oxalic acid to one pint of water (which, however, will not dissolve all the oxalic acid) and apply it with brush or swab, which will take out of the wood any discoloration, and when dry, sandpaper, dust, refill and finish as you would new work. It is not necessary to treat the wood or wash off the

oxalic acid, and though more expensive than the use of ammonia it is a cleaner method and leaves the wood in better condition.

One part of muriatic acid to five parts of water will also remove discoloration from light, hard woods, but in either case the workmen should be very careful in handling the solutions, both being powerful poisons, though oxalic acid is not so injurious to the hands as muriatic acid. The solutions must be made in an earthen or stone vessel and should be carefully labeled and put out of harm's way when not in use.

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Lettering on Wire Screen to Appear Solid.

If the lettering is to be done on closely woven fly screen, you require a paint that will fill the meshes solidly, which can be accomplished by holding your paint stout, using stiff paste colors, mixed with drier and a good elastic, heavy bodied varnish, so that it will at once fill the meshes and dry hard and thoroughly.

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Method for a Dead Finish in Old Ivory Tint.

First see that the wood is sandpapered perfectly smooth and dust carefully. Prime with pure white lead, thinned with equal parts raw linseed oil and turpentine, adding a little good japan. Apply thin, so as to avoid brush marks, and when dry, sandpaper with No. 0 paper. Putty up with white lead putty, which allow to dry hard. Now apply two thin coats, at least, of pure lead, tinted with a little raw sienna and thinned with turpentine and a trifle japan dryer only; use a fine bristle chiseled brush and sandpaper each coat. If this does not give a good surface, apply more of the same lead paint and sandpaper smoothly and dust off carefully. The surface is now ready to receive the finish, which shall consist of at least two coats of zinc, ground in damar varnish, which should be tinted old ivory with raw sienna and some yellow lake, both ground in japan or varnish, thinned with turpentine and a good pale, hard-drying rubbing varnish. Rub down in the usual way with pumice and water to a dead finish.

Whether you are required to spend more time on the job depends upon your contract, but the foregoing will make good and serviceable work for interiors, though not of the very highest order.

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Roughstuff for Sign Work.

There are hundreds of formulas for preparing roughstuff, and they vary only as to the coarse material, which is mixed into white lead, the latter being, along with rubbing varnish and japan, the essential part of every elastic roughstuff, the proportions varying as to the time of drying. To make a 24-hour roughstuff, take one part, by weight, of pure white lead in oil and three parts, by weight, of dry American umber, or ground slate, and mix with two parts rubbing varnish and one part coach japan to a thick paste, which thin with turpentine to brushing consistency.

Quick roughstuff, of which two coats can be applied within 8 or 10 hours, can be made from equal parts of pure white lead in oil and dry Reno filler, or American umber, made into a stiff paste, with equal parts of quick-rubbing varnish and coach japan, thinned with turpentine for application.

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Efflorescence in Rough-Plastered Walls.

Paint peeled in large blotches from a roughcast wall of a building in two years. The wall was thoroughly dry and had been on nearly two years. The paint was first class, and well applied in two coats—buff color, made from pure white lead and French ochre. Wherever the paint peeled there was a saltpetre-like spotting on the plaster.

It is a difficult matter to prove that the salt-like material which has pushed away your paint is really saltpetre, which seems to be the name which is, by common consent, given by painters to all the efflorescence so frequently noted on stone or brick walls, even after they have stood for years. We have noticed this on buildings that did not show it during the first ten or fifteen years after erection, and then, after every driving rainstorm, this white efflorescence became more and more prominent. When this occurs many painters are nonplused as to probable cause, but it is an entirely natural phenomenon, a body which was part of the clay out of which the bricks were made and which burning in the kiln was unable to remove. When the stones or bricks become saturated with moisture the mineral salts are dissolved and force themselves to the surface. As in the case of the bricks, so it is with plaster; the surplus mineral salts in the lime and cement are also dissolved by moisture and forced out, and this causes the lime, cement and brick to become harder with age. We, therefore, believe that, in spite of your belief in the dry condition of the wall, there was moisture present, and no one can blame you or your paint for the trouble.

There has been so far no paint invented which will prevent walls from giving off efflorescence in the presence of moisture.

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Imitating Ground or Frosted Glass.

The trustees of a church wanted the windows renovated. The glass had been painted seven years before, partly in imitation of stained glass and partly with white lead in oil, turps and drier, tinted a light blue. While the imitation of stained glass had stood well, the light blue paint all came off, and this they wished removed. The painter who was to do the work had heard there was an acid which could be applied to the glass to give a perfect imitation of ground glass.

Your informant is correct. There is an acid that will eat into glass and give it the effect of having been ground, but it will not suit your case. You would have to take out the windows, clean them thoroughly, coat the sash edges with wax to protect them from the acid, and afterward remove the wax again. The acid he has reference to is hydrofluoric acid, made by dissolving powdered fluor spar in sulphuric acid. This must be kept in leaden or gutta percha bottles, and cannot be applied with a brush, but the glass is laid flat and the acid

poured over it, and as soon as it has taken effect, that is, as soon as the glass is obscure, the acid is poured off and the glass rinsed with cold water. You would have to be very careful in using the acid, as it is very powerful, and we would suggest to you to employ any one of the following methods:

Make a solution of gum arabic in water and dissolve in this solution all the Rochelle salts it will take up, let it stand over night and after the glass is well cleaned, flow on the solution, so that it will not run, which can be done with a soft, flat varnish brush, where it is convenient to lay the glass flat. When dry, flow on a thin coat of damar varnish. The solution may be tinted or colored with colors in distemper.

Or use white sugar of lead, ground fine in oil, apply this same as any oil paint; color, if desired, and pounce, while the paint is still fresh, with a wad of cotton batting, held between thumb and finger.

Still another method, which strikes us as the most convenient, is to take white lead in distemper, that is, white lead ground fine in water to a stiff paste, thin it down to a brushing consistency with a solution of gum arabic and common salt in soft water. This may be colored or tinted to suit, and will adhere so well that it will eat into the glass and last for years. If on application it shows brush marks, go over it with a mottler or stipple it.

Should you desire to use ordinary oil paint, thin the paste with equal parts boiled linseed oil and turpentine, in which some beeswax has been dissolved, apply it with the brush and rub out well, then take muslin cloth of fine grain, dampen it somewhat and place inside a wad of cotton and with this bag pounce the paint all over, so as to show no brush marks whatever.

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Combed Walls—How to Mix Paint Properly for the Work.

The walls of a bath room are to be painted sky blue and combed.

It is best to use pure white lead, ground stiff in oil, thin with equal parts raw oil and turpentine to a fairly stout batter, add your blue, already broken up in turpentine and some paste drier, the liquid drier being liable to make your paint too thin. If you choose, you can add some fine bolted whiting to your paint to make it stout, but in that case you must strain it well before use. If you use Prussian blue, omit the whiting, because it is liable to give a greenish effect, and substitute zinc white to body it up. Before you begin, try a little patch to see whether your paint will give the proper thickness of film for combing and whether it holds up after combing and does not run over the furrows made by the comb. A little rubbing varnish added to the paint will aid in drawing clear lines with the comb. Above all, try your paint first on an out of the way space of the wall.

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Causes for the Fading of Paint on Exterior of Foundries.

Four months after the exterior of an iron foundry was painted one coat, the bottle green paint used for the trimmings had faded to a lead color. The building had been erected three years previously, built of

cypress wood and painted two coats, drab color for body and bottle green for trimmings, supposed to be best lead and oil, but really composed of white ochre and dry Prussian blue, lamp black and yellow ochre. The second painting was done with a certain brand of supposedly pure white lead, oil and drier from the same manufacturer, also Prussian blue, ivory drop black and pure stone yellow ground in oil for tinting, all mixed at the same time and strained.

You have neglected to state what condition the surface was in when you undertook to renovate that building with one single coat of paint. We have to do some tall guessing, and from your statement of how the building was painted originally we conclude that the surface was in such shape that one coat was utterly insufficient to produce a good job of repainting, no matter of how high a grade your lead, oil and colors were that you employed in making your paint. The firm you mention does not corrode white lead, and that pure white lead is most likely a so-called graded lead and may contain a white pigment that does not hold colors well in severe exposure. However that may be, we will not discuss such point as bearing on your case, because it is much more probable that what you call fading is a sinking in of the oil into a surface which must have been in very bad shape when you applied your paint four months ago. Most likely the oil from your paint was absorbed by the old surface and your pigments are left practically dry on the surface. As they are not of a character to be readily attacked or affected by gases, we would suggest that you wash off a small space of the apparently faded paint with a very weak ammonia solution, and wipe dry, then apply with a soft sponge a little boiled oil and see the effect.

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How to Produce Frosted Mirrors in a Simple Way.

Beautiful frosted effects, of a temporary character, are often used in public houses, barber shops, stores, etc.

These mirrors are covered with a solution of epsom salts in stale beer, which is applied with a sponge to the mirror plate that has been wiped clean and dry previously. On drying, the epsom salt crystalizes, giving very handsome frosted effects, but the solution must not be applied on humid days, when the glass is liable to be damp, for in that case the effect will be a blurred one. When it is desirable to remove the coating, lukewarm water will serve the purpose without damage to the luster of the mirror.

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Rapid Fading of Pink Tints on Exposed Surfaces.

The owner of a dwelling house insisted on having a light pink for the body. The painter used a combination of three parts white lead, one part American zinc, raw linseed oil of best quality, and a little good liquid drier, using American vermilion for coloring matter, but as this made too strong a pink to suit the owner, it was toned down with chrome yellow. While the paint was wet the color satisfied the owner, but in drying every trace of the pink tone disappeared, leaving a dark, creamy yellow effect in its place.

American vermilion or chrome red, as it is called in Europe, is one of the most stable pigments in that line, and it is utterly impossible for it to fade out while the paint is being applied, no matter how severe the exposure. In fact, with the exception of madder lakes or one or more reds of similar permanency we know of no pigment in the vermilion line that would hold its color as long on exposure. We think the term "fading" is a misapplication in this case, and that it is rather a "bleaching out" on the part of the white bases during the drying process, the vermilion being more crystalline in structure, sinking in, and the more amorphous white and chrome yellow floating to the top. This seems to us the only logical way to explain the cause of the trouble. A red of much lighter specific gravity than American vermilion would, no doubt, have given different results, it would have "held up" better, but if fleeting in its character would have actually faded in a short time. A delicate pink tint will not stand well on severe exposure, no matter how well made.

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Spotting of Painted Walls and Ceilings.

Two parlors, dining room and reception hall, were painted in rose tint, terra cotta and green tint. Pure white lead, boiled oil and high grade mixing colors were used. The walls being hard finished, the wall paper was scraped off, the walls properly patched and sandpapered and three coats applied in the dining room and reception hall, while the parlor was given four coats; the first coat only being white lead and oil, all others thinned with turpentine only to a dead flat finish. The work seemed to be perfect, but in two weeks all began to show spots which grew larger and larger, until it appeared like half-dried kalsomine.

We could recount a number of causes for the trouble you mention, but as you have stated the case so plainly we can see no other explanation but that you did not get your wall to a uniform suction, in other words, in some places the paste came off with the paper, while in other places or spots it remained on the wall and stopped suction. The wall being of hard finish, the suction was not marked enough to notice it on the oil coat and two days between coats was not a long enough time to make it apparent. We have seen walls where cracks were filled with plaster which was not sized before repainting the walls and yet the suction did not show for a month or more, but finally it did very decidedly. The same applies to patched up walls, and the only preventive is to put a good coat of glue size or shellac varnish over the first coat to stop suction. Most varnish manufacturers offer a suction varnish for this purpose, but shellac varnish is best. While we do not approve of using boiled oil in the priming coat for plastered walls, we do not think that the trouble is due to this or the white lead or the mixing colors employed, but entirely to the neglect of stopping suction in the wall. No matter how many coats you apply now to the walls in question, the same trouble will appear again, and the only remedy is to give a coat of shellac varnish, reduced so as to flow freely, so that it may be applied in a uniform film and without laps and apply two more flat coats of the desired tint. Priming for finishing walls.

that have not been painted before should always be white lead, well thinned with raw linseed oil and a little drier, and well brushed in. Following this with a coat of glue size or shellac varnish will stop suction and save two coats of paint. The next coat should be thinned with equal parts of boiled linseed oil and turpentine, and over this two coats of flat paint are needed for a good flat finish. The best decorators of the East seldom give less than one coat of size and four coats of paint, but mostly five or six coats.

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Value of the Iodine and Saponification Tests for Linseed Oil.

Church, in his *Chemistry of Paints and Painting*, says that the nitric acid test produces reactions in which the oil and the acid acquire varied colors characteristic of different oils. These tests must be applied under exactly similar conditions of temperature, agitation, lapse of time, strength of acid, etc., and even then, unless the experimenter is well versed in his work, the indications obtained are sometimes perplexing and difficult to interpret.

It would take up too much of our space to describe the iodine and saponification tests named and be useless at the same time, as they are conclusive only when made by a skilled chemist, and therefore we will state only the value of the tests.

The linseed oil that absorbs the most oxygen is the best oil, and to determine this characteristic the iodine test is employed. As linseed oil combines very readily with iodine, it is determined how much of it will combine with the oil. As the average amount of iodine taken up by linseed oil is 156 per cent. of its weight, and as the non-drying oils do not take up over 8 to 20 per cent., the value of the test will be readily understood. The higher the iodine numbers of an oil, the greater its power of absorbing oxygen, hence the greater its drying properties.

The saponification test is valuable in determining the presence of rosin or mineral oils, because these do not saponify. A certain quantity of the suspected oil is placed in a suitable vessel with some water and a little alcohol, then caustic soda is added and the mass boiled, stirring at intervals. The linseed oil becomes saponified, while rosin or mineral oil are not acted upon.

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To Remove White Stains From Varnished Table Tops.

Wanted a method for removing the white stains made by whisky or wine from table tops without injury to the varnish.

We have not tried it ourselves, but the steward of a large clubhouse told us a short time since of a simple method, which accomplishes the purpose with little trouble and expense. He takes ordinary sal soda, powders it very fine in the dry state, and sprinkles this powder over the stains, allows it to remain a few minutes, then takes a cloth saturated with kerosene and rubs first the stained spots and finally the whole table top, following with a dry cloth to give polish. We have seen the tables thus treated and believe the method worth trying.

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Removing Rust and Grease Spots From Marble.

Rust spots on marble are usually produced when articles of iron are laid upon the wet marble or allowed to rest upon marble in humid atmosphere. These spots penetrate rather deeply, as marble is very porous, and can be removed only by rubbing down the marble deep enough to obliterate the spots and then repolish the surface. As even the weakest acids will destroy marble, such radical treatment cannot be thought of, or oxalic acid would be the proper remedy. Grease spots from paint, oil or from touching with dirty hands, can be removed by applying to the surface a stout batter made from equal parts of slaked lime and white pipe clay mixed with water or calcined magnesia and white pipe clay will also serve the purpose. This batter is applied in a thick layer all over the surface and allowed to remain for two days, during which time it must be frequently moistened with water and only allowed to dry after the two days are over, when it is removed by wiping it off with a soft cloth. Then the surface is polished with a piece of soft leather and finest bolted whiting. Artificial marble, however, cannot be treated in this way, as this article will not stand it.

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Cement Made from Cheese and Lime.

We have no experience in the use of casein for cement, but we know that in paints it is a good substitute for glue. For your purpose, i. e., for cementing fractured articles of metal, stone, porcelain or glass we know of a simple preparation in which cheese also takes a most important part. Take ten parts by weight of fresh cottage cheese, not too dry, and two or three parts of freshly slaked lime. Mix well and use immediately. It cannot be prepared ahead, as the mixture sets as quickly as plaster of paris.

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How to Mix Graining Colors to Work and Blend Well.

If you purchase graining color in oil, you will adhere to the directions given by the manufacturer in thinning the same. But if you use colors in oil, put up for general trade, you will require equal parts boiled oil and turpentine for thinning, and then add about two tablespoonsful of a good japan to each pint of the thinned color. To make your color flow and blend well add a little soap or whiting or both.

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Warm Colors as Against Cold Colors, or Light and Dark Colors or Shades.

As you, no doubt, know white and black are not colors, the first representing light and the other all absence thereof. When the two are mixed, a gray is produced, representing in its various

depths the stage from light to darkness or vice versa. Whenever black predominates, the color is cool or cold; if white is in large proportion, the tint may be said to be warm in tone, or in solid colors, where yellow or red predominate, the color is warm or hot. But when a color is dull, and impresses the eye like the passing of a funeral cortege, as it were, then the color is termed somber, because a color can be cool or cold and yet be pleasing to the eye, if in harmony with other surroundings. Dull means that a color is devoid of life, lacking richness of tone. Old is a term applied to certain colors made in imitation of articles or things that have changed with age or faded, as, for instance, old rose, old ivory, old mahogany, in contradistinction to rose, ivory or mahogany. In modern paint nomenclature names are borrowed from perfumes, from the temples of fashion, and there is such a variety of these as to set an old-fashioned painter on the verge of losing his reason. Ashes of roses, elephant's breath, etc., are the names of tints given on sample cards. We wouldn't know how to compound a tint that looked like the breath of an elephant, no matter how hard we tried, nor do we know what "café au lait" means, or what Murray looked like or Pompadour, either. Light, medium and dark are the distinguishing terms of three hues of one and the same color, and such color need not be somber, because it is dark or deep, nor need this color be hot or warm, because the hue or shade is light.

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To Remove Weather Stain on Milwaukee Brick.

Make a strong solution of rock potash in boiling hot water and apply with a sponge to the stains. If this does not remove the stains, there is no remedy, excepting to heat the bricks with a gasoline burner and then coat them with paraffin, a rather costly undertaking and by no means a certain remedy, either. If the treatment with muriatic acid solution did not do any good, at least temporary, the trouble is in the composition of the bricks.

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White Lead and Oil Paint Blackening, Where Not Exposed to the Direct Sunlight.

A house located on a hill, with no shrubbery within twenty feet, was painted white with good white lead and linseed oil, but turned black on the sides not fully exposed to the sun.

We think the case is not exactly one of blackening, but that the oil has darkened and the paint had no opportunity to bleach out, because of a lack of warmth and light. It may be a case of so-called mildew, or fungus growth, and the best thing to do, would be to try a space, rubbing it with a sponge saturated with turpentine, to see if the whiteness cannot to a certain extent be restored. If not, the best thing to do is, provided the paint is fairly hard, to give it a coat of lead and zinc, in the proportion of 2-3 lead and 1-3 zinc white.

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Painting Machinery to Stand Heat and Ammonia Vapors.

First fill all your machinery parts requiring painting, with iron filler or surfacer, that you can obtain from any reliable paint manufacturer, as per directions on label of package. Then apply one or more coats of the color in japan, that you fancy for the purpose, thinning the paste color with turpentine, to which add some varnish for binder. For finish, use a good, fairly-quick drying baking varnish. Should you desire no particular color, we would advise you to use two coats of a good black baking japan over the filler and surfacer.

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White Lead in Oil and Dry Lampblack Chalking.

A house was painted a medium shade of gray, made from pure white lead in oil and dry lamp black thinned with linseed oil. In four months the house had turned white in spots and was chalking as freely as though it had been painted four or five years.

To be frank, we are unable to tell the exact cause of chalking, but will say that it is a bad error to make a paint of white lead in oil and use dry lampblack for tinting the same. You cannot make an intimate mixture in that way, no matter how carefully you try to do it. There are several possibilities, viz.: The dry lampblack is enveloped in the lead in oil, and becomes lumpy, and though not noticeable at first, will play just the trick mentioned after being exposed. The surface on which the paint was applied may have been much more dry and porous in certain spots than in others, causing a variation in the appearance of the paint in different places. The premature chalking of the paint may be due to a very dry surface, which absorbed the oil from the paint, leaving it practically dry and without binder. Try this by applying a good coat of raw oil on the spots, where it has turned white, and where it apparently has chalked most, and note the result. Three parts of good kettle-boiled linseed oil and one part of turpentine make an excellent paint renovator.

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Groundwork for Bronzing Articles of Wood.

Prepare first a thin glue size by soaking good animal glue over night in cold water and melting it next morning in the usual water bath. Strain it, before using, through old linen or cheesecloth into a clean vessel. Sandpaper smooth and dust the articles, then apply with a soft-bristle brush two or three coats of the size, allowing sufficient time for each coat to harden before applying the next. Now, a ground coat made by thoroughly mixing finely-bolted gilders' whiting and glue size is applied, and when this has become hard it is rubbed to a smooth, even surface with selected fine pumice, and then given one coat of thin copal varnish. When this is nearly but not quite dry, the bronze powder is applied with a suitable brush or wad of cotton, and when dry the surplus bronze is removed with the same tool. If collected on clean paper, the dusted-off bronze powder may be used again.

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Simple Method to Fasten Leather or Oilcloth to Table or Desk Tops.

You may use the same paste for leather as you do for oilcloth or other goods, but the leather must first be moistened before the paste is applied. We would advise you to prepare your paste as follows: Mix two and one-quarter pounds of good wheat flour with two tablespoonsful of pulverized gum arabic or powdered rosin and two tablespoonsful of pulverized alum in a clean dish with water enough to make a uniformly thick batter; set it over a slow fire and stir continuously until the paste is uniform and free from lumps. When the mass has become so stout that the wooden spoon or stick will stand in its upright, it is taken from the fire and placed in another dish and covered so that no skin will form on top. When cold, the table top, desk top, etc., is covered with a thin coat of the paste, the cloth, etc., carefully laid on and smoothed from the center towards the edges with a rolling pin. The trimming of edges is accomplished when the paste has dried. To smooth out the leather after pasting, a woollen cloth is of the best service.

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White Gloss Finish in Bath Room Turning Red.

A bathroom was painted with Tuscan red and varnished. Seven years later it was repainted in white—two coats of lead and two coats of zinc in damar varnish. Twenty months later the door of the bath room began to turn red, and four months afterward it looked as if it had been given a thin coat of cherry stain. The rest of the woodwork in the room had not changed, except in a few places where it had spotted red. It is difficult to theorize when details are so meager, for it is not stated what was done to the old surface before it was repainted in white. Was there an attempt made to remove the old varnish with a caustic or alkali, or was the varnished surface simply sandpapered? In the first case, the alkali may not have been thoroughly removed or neutralized, and therefore acted slowly on the remaining coloring matter of the Tuscan red, at the same time softening and thereby coloring the white lead coats underneath the zinc and varnish. In the second case, if the varnish over the Tuscan red was removed by sandpapering, the latter being unprotected and probably powdery, may have given up its coloring matter, or, in other words, bled into the white lead, unnoticed at that time, but later on showing up in greater strength. That it shows more prominently on the door may be due to strong light, as for instance, the sun striking the door. Or it is just possible that the discoloration was caused by the fumes of a disinfectant used in the bath room.

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Spotting and Discoloring of Paint on Plastered Walls.

A painter was called on to finish some walls plastered with agalite cement, finished rough. He first sized with good white glue; then applied first coat of oil color, two parts oil to one of turps; second coat lead tinted a medium shade of green, with chrome yellow and

Prussian blue, thinned with turps and enough damar varnish to dry flat. Although it was a good flat finish and a beautiful job, in less than two weeks yellow spots appeared. These were touched up with glue size, later with shellac and then with varnish, but the discoloration returned. When the surface where these spots occur is scraped, the plaster appears to be soft. These spots only occurred on the parts of the wall painted with this green tint; the yellow, tan, blue and gray tints not being affected. We always caution against the painting of hot walls, whether they be of ordinary plaster or cement of any kind, because of the risk attached to such jobs; but, of course, the painter is often called upon to do the work and cannot well refuse, because he is not in business for pastime. There are, however, in such cases, simple precautions that, when judiciously employed, will lessen the risk of early disintegration. Cement plaster is more or less alkaline, and the salts are sure to bloom out, first discoloring and finally throwing off the paint in spots. That such discoloration or spots have not appeared on the other tints is no criterion that the fault is not in the cement, as there may be two factors to have prevented it on the walls covered by these tints; first, the cement may have been less alkaline, or less of it may have been used, and, second, the colors used in those tints are not affected by alkaline salts, as in Prussian blue. The blooming out of the alkaline salts in cement mortar or plaster will occur in spots, and this action may be hastened by moisture, and, as Prussian blue is readily decomposed, even by weak alkalies, you will readily see what caused the trouble. The logical conclusion is that under the spots mentioned a blooming out of the alkaline salts has taken place, eating through the glue size and paint and destroying the color of the Prussian blue in the tint, leaving buff or yellow spots. If the wall had been first coated with raw oil or thin oil paint and then glue sized, it would, no doubt, have delayed the perishing, but in time it would have made its appearance anyway. Ultramarine blues or copper blues are not affected by alkalies, neither are ultramarine greens or copper greens. But it must not be supposed that the use of Prussian blue in that tint had anything to do with the disintegration of the paint, for this should have occurred all the same, though it would not have been noted in so short a space of time if Prussian blue had not been a constituent of that tint. We would advise you to see whether the spots have extended in area; and if not, to scrape all of the affected surface clean down to the plaster, cutting out as much of it as appears to be necessary to keep it from spreading, and filling up again with plaster of paris, which, when dry, coat up with white lead thinned with japan varnish and turps to stop suction, then with the tint to match the other parts of walls, and finally give a coat of lead tinted with ultramarine blue and zinc yellow, which will, at least, not show any discoloration, because unaffected by alkalies. Or, if you can by the above means arrest further disintegration of the paint from underneath, it may be safe enough to use the same tint that you have used before.

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Cement for Broken Plaster Casts.

Into a wide-mouthed bottle or glass jar place some small pieces of celluloid, pour sufficient sulphuric ether over these, and cork

tightly. Shake the bottle or jar frequently until the celluloid is dissolved, let it rest awhile, then decant the clear liquid into another bottle and use the gummy portion in the bottom of the original bottle or jar as a cement, which will dry rapidly and is insoluble in either hot or cold water.

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The Proper Name for Barytes in Commerce.

Barytes is the trade or commercial name for sulphate of barium, otherwise barium sulphate, which are the chemical terms for the mineral known as heavy spar, after it has been bleached, washed and ground into a fine powder after drying. Blanc fixe is artificial barytes, very much finer in texture and more opaque than the ordinary kind. It is also known as permanent white, baryta white, etc., and is largely employed to cheapen white paints, as well as colors, and is the base of nearly all commercial chrome greens. As to its use on a new plastered wall, we cannot see the advantage thereof, unless you desire to mix it with white lead or some other pigment of body, when the barytes will act as a sort of filler, as well as a cheapener of your material. It being entirely inert and unaffected by alkalis, we cannot see any objection to its use, any harm that may come to the paint from a new hot wall would be through the oil being affected, or to color, that is not alkali proof.

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Best Material and Method for Painting Brickwork in Flat Finish.

The best way to paint a new brick wall in red is to use a good Venetian red in oil, thinned with pure raw linseed oil and a little liquid drier only. Have this priming thin and flow it on freely and brush it into the brick well. Give plenty of time for drying, then putty up. For second coat use at least 25 per cent. pure white lead with your Venetian red and thin it with three parts raw linseed oil and one part turps, adding the necessary drier. Have your paint for this coat of good body and rub it out well and even.

For the third or finishing coat use a fine, stiff ground Venetian red of the proper shade, and if necessary for light red brick, add some French ocher to obtain desired shade; thin this with plenty of brown japan and turpentine to a thin wash and apply quickly, avoiding laps. If it does not flat immediately, it will do so in a very short time. Should it dry too flat or lack binder, add a little boiled oil. The best plan, however, is to purchase the flat brick red offered by paint manufacturers, and thin and apply as directed by them. If the brick front is to be lined in white, use white lead thinned with turps; for black use lampblack in oil, thinned with japan and turps. When you undertake to paint brickwork always see to it first that the brick is dry. If you paint immediately after heavy or driving rains or where there are leaky roofs or cornices, from which the bricks become damp, you run a heavy risk, as your paint will surely scale sooner or later. If you find the wall is not in proper condition for painting, call the owner's attention to it, and if he persists in having the job done without first remedying the defects, do it at his risk only.

The best size for new common brick that is to be painted is an oil priming, as noted above. The pigment to be used in this priming may be white lead, yellow ocher, Venetian red, mineral brown or any other mineral paint that may be suitable or allow succeeding coats to cover well. No other size or material is suitable for first coating exposed brickwork, new or old. As to a size for new plastered walls, we do not approve of a size directly on the plaster, but recommend a thin wash of white lead, thinned with pure raw linseed oil and a little turpentine to make it penetrate well into the wall. Unless the wall is very hot this will neutralize whatever causticity there may be in the plaster, and when the priming is dry a coat of glue size may be given, which will save several coats of paint. When a new wall is still very hot, that is, when the lime in the plaster has not had an opportunity to become neutralized, it is best to give a wash of vinegar before priming.

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Pigments and Medium for Water Color Painting.

As to the history of water color painting it is said that the ancient Egyptians used this method in their wall paintings. They covered the walls with stucco, traced the outlines in deep red, used a ground of white and colored the various parts. The technics of the wall paintings in the catacombs point to a similar method. The term "aquarelle" was applied to transparent water color paintings, while "gouache" indicated the opposite or opaque painting in water colors. This has changed during the last half century, so that both aquarelle and gouache are employed together. The pigments used in water colors are of both vegetable and mineral origin, the latter being more permanent. The medium consists of Senegal gum or gum arabic dissolved in water, or of a mixture of equal parts of these, and the same quantity of white rock candy dissolved in cold water. But the "moist" colors in tubes have come into use and are both safe, economical and save the artist quite a good deal of trouble, as he does not now require slab and muller. The principal pigments for water color painting are yellow ocher, raw and burnt sienna, burnt ocher, Indian red, Van Dyke brown, indigo, Indian yellow, vermilion, orange mineral, carmine, ultramarine, emerald green, stil de grain, lampblack, cobalt blue, red oxide of iron, Chinese (zinc) white, and for the lights the more opaque Cremnitz white.

In addition to the above we might mention aureolin or cobalt yellow, a transparent color, excellent for landscape painting, but not very stable in moist air, cadmium yellow, which is of good body and washes well, and is very useful in forming tints for clouds and sunset scenes. Orpiment or King's yellow cannot be used with white lead or chrome yellow, because it tends to blacken in such combination, and Naples yellow, a pigment of great opacity, and very useful in flesh tints, will decompose in the presence of other metallic oxides, but can be replaced by a mixture of cadmium yellow and Chinese white. For glazing purposes gamboge is used in the line of yellows. The madder lakes, red, rose and pink, are very permanent and brilliant and form a valuable addition to the line of reds. In the line of greens, oxide of chromium

green, viridian and terra verte should be mentioned as very staple and useful. French blue replaces the native ultramarine, which is too expensive and too easily destroyed. Cerulean blue is very permanent, when well prepared. Prussian blue is changeable in the presence of alkalies, which tend to turn it brown, and its use should be avoided, unless on surfaces, where alkalies are not evident. Antwerp blue is more unstable in water color than Prussian blue. Vine black or blue black is preferable to lampblack, where intensity is not required, because not so sooty. Purple madder or purple lake is useful for producing warm shadows.

Brown madder, burnt umber and raw umber form good additions in the line of brown pigments. As to gray pigments, ultramarine ash is furnished as a moist color and assists in producing good atmospheric effects. Neutral tint is a gray compounded of blue, red and yellow, and cannot be relied upon for permanence. "Aquarelle" painting is usually done on paper, which must not be too coarse in texture, nor too heavy, but also on parchment, silk satin or wood, without first preparing a ground.

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How to Prepare and Apply Luminous Paint.

To the best of our knowledge, chemistry knows of four sulphides only that have the faculty of being phosphorescent in the dark, when they have been exposed to daylight for a few minutes. They are the sulphides of calcium, strontium, barium and zinc; in other words, combinations of these elements or metals and sulphur. Sulphide of zinc, made in the usual way, will not phosphoresce; to do this, it has to undergo a special process, that of being distilled in vacuum.

Sulphide of barium phosphoresces orange, but only for a few minutes after exposure to light, and is therefore of less use than the sulphides of strontium and zinc, which give a greenish light, that, however, extinguishes in from one to two hours. Then there remains only one material of any value as a luminous body: the sulphide of calcium, which, in its pure state, gives a yellow light, but can, by proper treatment—that is, by heating to red heat and the addition of small quantities of salt of bismuth—be made into a body that will give a violet light for at least twenty-four hours after each exposure.

For interior use the paint is applied on paper, and two coats are generally sufficient. It is prepared as follows: One pound of clear white gelatine or transparent white glue is dissolved in boiling water, say five pints, and into this is stirred three pounds of sulphide of calcium and one ounce of glycerin. During application the paint must be kept warm and constantly stirred.

For exterior use the sulphide of calcium should be mixed with clear damar varnish in the proportion of one pound pigment to two pounds varnish, applied in two coats, which, when dry, must be coated with clear damar varnish.

Phosphorus will not answer for luminous paint, and you had best ask your nearest druggist to procure for you sulphide of calcium in fine powder, and caution him that it must be in good condition or you will

not be able to use it. If your druggist has the material on hand it will be best to try some of it in a small way before you go to a lot of expense with material that may be imperfect.

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Value of Carbon Black and Mineral Black.

A sample submitted, although containing a certain percentage of carbon, does not come within the strict sense of the term carbon black. The proper name for it among paint men is mineral black, because, aside from carbon, it contains slates in very large proportion. It is a fine specimen of the same paint material that is mined in the neighborhood of Muncy, Pa., and is sold under such names as Keystone black filler, Muncy black filler, iron filler, etc. This sample is slightly more black than those quoted, which have quite a brownish tone, especially in the lower grades. They are quite useful in the preparation of iron fillers, but do not command a high market price. We find that they are quoted in carload lots, packed in good barrels, at anywhere from nine to twelve dollars per ton, f. o. b. works. Carbon black, as it is understood by the paint trade, is gas black, produced by the combustion of natural gas. It is free from grit and is the purest form of carbon that can be obtained, and is sold at anywhere from seven cents to twenty cents per pound, according to quality. The better grades are much stronger than the very best calcined lampblacks, but do not produce tints as clean. However, the hue of carbon black is much blacker than that of lampblack or of mineral black, and it is from ten to fifteen times as strong as the latter.

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English, American and Imitation Vermilion.

English, Chinese and French are of one and the same composition and come under the head of quicksilver vermilion, no matter where made. The quicksilver vermilion made in the United States is known under the name of English, and when sold in bulk it is usually branded quicksilver vermilion. In Europe it is simply known as vermilion or cinnabar red, while the aniline substitutes are known as vermilionettes. Quicksilver vermilion, no matter what may be the process, wet or dry, consists of 200 parts by weight of mercury or quicksilver, and 32 parts by weight of sulphur, producing when combined sulphide of mercury. The Chinese vermilion is generally accepted as the finest grade of quicksilver vermilion. It is said that some quicksilver vermilion is still made from cinnabar, the natural sulphide of mercury, but as the color of this product is not as good as that of the artificially prepared one and but little of the material mined, there cannot be much of a demand for it.

Under the term American vermilion a red pigment is generally understood, which is known in Europe simply as chrome red, or scarlet red chromate, and sold under such names as Persian scarlet, Imperial scarlet, Derby red, Chinese scarlet, Victoria red, etc. This pigment is known to chemists and color makers as basic chromate of lead, and is very crystalline in structure, and cannot be ground fine in oil or water without destroying its brilliancy. For this reason some manufacturers

tone it up with aniline or other coal tar products, but this only makes it fade or change more rapidly on exposure. By imitation vermilion, that is often called American vermilion, we understand a pigment made as a substitute for English or quicksilver vermilion, consisting generally of orange mineral or red lead and eosin or some other red dye stuff of coal tar origin. Under this head come also the red aniline color products, that have a mineral base, such as blanc fixe, barytes, whiting, clay or gypsum, or any of these in addition to orange mineral or red lead.

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Best Varnish for Hard Maple Floors.

Give them three coats of white shellac varnish. If grain alcohol shellac is too high in price to let you out whole, try wood alcohol white shellac.

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Method of Mixing Dry Lampblack Without Grinding for Tinting Purposes.

Purchase only well calcined lampblack, that is free from greasy matter and wet it up first with turpentine, beating it into a stiff paste, then gradually add your linseed oil and driers under constant stirring. Should it still be lumpy, run through a fine paint strainer and it will not make your tint streaky.

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Stopping the Suction in Plastered Walls.

Where glue size will not stop the suction in walls or ceilings, a varnish size is the best remedy. Take good hard oil finish or copal varnish and thin it down with an equal measure of turpentine, or if this be too heavy, use two measures of turps to one of varnish. The condition of the surface must guide you in preparing the size. It must be so thin that it will dry flat, or very nearly flat. You must also see that the size is dry and hard before applying the paint, otherwise it may crawl or crack.

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Paint for Hot Water Pipes and Steam Radiators.

Most every paint and varnish manufacturer makes a paint suitable for the purpose named, and we would advise you to take advantage of their experience, instead of wasting time and money on experiments. We shall, however, give you all the points we can on the subject. In the first place you must see that the surface is free from scale, rust and grease, and it is best to paint the pipes and radiators while warm, so that the paint may bake on, because when applied while cold and the paint is allowed to dry and the hot water or steam turned on suddenly, the paint is liable to blister or scale off. Nor must the heat be so great that it will boil the paint during the drying and baking process. Select such colors only as will not be affected by heat

to any extent, have them ground fine in japan or varnish, thin with turpentine to the consistency of varnish and add a good baking varnish sufficient to produce a glossy paint of good working consistency. Where white is required, do not use white lead, but zinc white only. For black use ivory black, and for tints use also zinc white as the base. Yellow ocher, sienna raw and burnt, burnt umber, Venetian red, ultramarine blue and zinc yellow are the only pigments that will not change color appreciably when used on heated surfaces. For bronzing, select only the very best and finest grades, because all the ordinary bronzes darken rapidly on heated surfaces. Mix japan gold size and pale baking varnish in equal parts and thin with three times as much turpentine and add sufficient bronze powder to work well and apply. If the luster is not good enough apply a coat of the liquid over the paint, and while still tacky brush on the dry bronze and polish with a woolen cloth. Paint dealers usually carry a stock of radiator and other enamels, bronzes and baking japons or baking varnishes.

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Simple Test for Purity of Turpentine.

Drop a small quantity on a piece of white paper, expose it to the air and if the turpentine is pure no traces will be left. If oil or other foreign matter is present, the paper will be greasy or soiled. This test can be applied by any one and requires no skill.

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Hanging Heavy Embossed or Pressed Wall Paper.

We will begin by giving you a few practical hints. In hanging paper, where the room has been occupied for a time, it is essential that the room be cleaned, the floor washed, the ceiling and walls well brushed down, and, if there are any flyspecks visible, washed down. When beginning work the paper hanger should have handy a piece of pumice stone, a basin of clean water, a clean sponge and towel, and use the same when and wherever needed. It is best to use a round brush for the paste, because easier handled than a flat one, and cleaner, also, as it can be turned in the hand, thus preventing the paste from soiling the printed side of the paper.

It is not so very difficult to hang pressed or heavy embossed wall papers, but greater care in handling is required and more time must be necessarily taken than is the case with ordinary goods. In the first place, it is necessary that the walls should be lined with brown paper, so as to give a more absorbent surface to the paste on the embossed paper, so that the raised or pressed figures will not be unduly moistened. Embossed paper will not stick well to a hard finished or plastered wall without this lining paper. The ordinary wheat flour paste will serve well enough for fastening the lining paper to the wall, but it must be quite heavy for embossed or pressed paper. Each piece of the embossed paper must be trimmed dry with straight edge and knife before pasting, and while this requires greater care in applying the paste, it is necessary, in order to get the piece quickly on the wall before the paste has an opportunity to soak into the relief figures and make them limp and flat. A very soft brush must be used in applying

the paper in place of the stiff brush or roller, and the seams should be allowed to dry before applying the seam roller, and even then the roller must be handled gently, because the color leaves embossed paper more readily than is the case in ordinary papers. The principal point is to handle the paper delicately, without resorting to the usual pressing in or stretching so common in hanging ordinary goods.

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Waterproof Putty for Joints and Knotholes in Wooden Floors.

A mixture of five parts, by measure, of fresh cheese (the so-called smearcase or cottage cheese) and one part, by measure, of unslaked pulverized lime, kneaded together to a stiff dough, makes a cement or putty that becomes stone hard and is insoluble in water, and is, therefore, the material best adapted for filling joints and knotholes in wooden floors that are frequently washed. By the addition of mineral colors, such as raw or burnt sienna, raw or burnt umber, yellow or red ochre, mineral brown, Van Dyke brown, Venetian or Indian red, you can color this putty to any desired shade.

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Treatment of Varnished Floors Before Revarnishing.

The scratches and indentures from shoenails will surely show through any coat or coats of varnish that may be applied, unless the floor is sandpapered first with coarse and then with smooth sandpaper. The sandpapering must be done with the grain of the wood or the scratches made by it will also show through the varnish. If two coats of varnish are not considered too expensive, I would recommend a first coat of hard drying rubbing varnish, not flowed on, but rubbed out well and if the desired effect will permit, slightly stained to hide scratches and indentures with the appropriate color (ground in japan and first thinned somewhat with the varnish before it is added to the rubbing). This coat, if the job is to be a very good one, should be mossed with hair and pumice, but the latter proceeding may also be dispensed with and the surface merely dusted before finishing coat is applied, which should consist of a hard drying, yet elastic, floor varnish. If the job is to be hurried very much, a full coat of shellac varnish may be given in place of the rubbing varnish, and the floor varnish on top of this. Unless the floor is to have a very high luster, the two coats of varnish mentioned are sufficient. One gallon of varnish should cover from 450 to 500 square feet of floor space, one coat, if the old varnish is not too much worn.

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Water Paint or Oil Paint That Will Stand Without Peeling or Cracking on a Cement Wall.

The difficulty in painting comparatively fresh cement surfaces is not so much in the selection of the paint material, as in preparing the surface itself, so as to isolate or neutralize whatever caustic properties there may be that would tend to destroy the vehicle and, to some extent, the color of the paint. We consider it perfectly safe to coat a cement surface that is one year old and has been well washed

and rinsed with clear water and allowed to dry thoroughly with a linseed oil paint, same as a plastered wall. If the surface, however, be fresh, say less than one month old, we consider the dilute sulphuric acid treatment safest and best. To one gallon of water add twelve fluid ounces of oil of vitriol and with a swab apply this solution to the surface, repeating it when the first application appears dry. Allow to stand a day or so, then rinse with clear water, and when dry priming may be begun. This treatment will turn any excess of lime in the cement into sulphate of lime, which is harmless to the oil in the paint. It also produces a uniformly absorbent surface to which the paint will adhere well, while without this treatment there will be spots in the surface that are less porous than others.

If the cement surface is one or more months old, the sulphuric acid treatment may be omitted and a wash of four ounces of bicarbonate of ammonia dissolved in two gallons of water given in its place, in which case the surface may be primed with oil as soon as the wash has dried. For exposed work, we should certainly suggest none other than linseed oil paint, while for interior work a good water paint will do very well, providing the wall will not require frequent washing. In any case, the walls should be treated to a wash as above, in order to make the surface non-caustic and absorbent. Although we have never tried it ourselves, this suggestion of an old veteran in the painting business strikes us favorably: Thin down 33 deg. silicate of soda (soluble glass), with its own volume of warm water and apply one coat of this to the surface. When dry, which will be in less than two hours, give a coat of water paint made from Paris white and earth paint with starch for binder, repeating until good body is obtained, and when dry rub down with fine sandpaper. Then give a finishing coat of the dilute soluble glass, same as for first coat, and the job is finished, giving a stone hard surface.

— 283 —

How to Finish White and Yellow Pine.

The very best, though not the cheapest, way to finish white pine is to see that the work is well sandpapered with the grain, then thoroughly dusted. Give at least one coat white shellac varnish and one coat of inside varnish; if this is too expensive substitute liquid filler for the shellac. For hard or yellow pine finish, apply one coat orange shellac varnish and one or two coats light hard oil finish, or omit the shellac and apply hard varnish instead. A filler is not required for this wood.

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Various Ways of Finishing Hard Wood Floors.

In all cases see that the floor is clean, well planed and dry, put on a coat of three parts boiled oil, one part turpentine and one part japan, which may be colored, if desirable, with such coloring matter as will give the proper effect, but only enough coloring should be given to produce a stain, not a paint, so as to permit the grain of the wood to appear. When this is dry, apply a coat of paste filler, also

colored, when desirable, thinned with turpentine, and remove the surplus before it sets too hard, by wiping across the grain. When dry, rub smooth with sandpaper and putty up with putty of the proper color and hardness. So far this method should be followed, no matter what finish is desired, whether the floor is to be waxed or varnished. If it is to be varnished, one coat at least of shellac varnish is given, followed by more coats of shellac or good hard drying floor varnish, according to choice. The gloss of the varnish may be dulled by mossing or hairing with pumice and oil.

When a floor is to be waxed, the wax may be applied directly on the filler, or over an intervening coat of shellac varnish with a brush and polished with a large brush especially adapted to the purpose. The floor wax is prepared by melting in a water bath pure yellow beeswax and turpentine, but good floor wax polishes are offered ready made by many manufacturers.

When the floor is fairly smooth and the wood of close grain, the paste filler may be dispensed with, but a coat of shellac varnish should be given whether the floor is to be waxed or varnished.

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Soluble or Water Glass for Floors.

We have no experience with the use of soluble glass (silicate of soda) for floors, but can give you the following for what it may be worth and you can try it, the expense not being very great. The floor must be first thoroughly cleansed and cracks filled with a cement made from water glass and whiting; this dry, put on a coat of water glass, which is allowed to become hard, and followed by another coat when dry with pumice stone and oil. We should, however, caution you against using it on floors that are exposed to considerable dampness.

— 286 —

Carbolic Acid and Soft Soap for Removing Paint and Varnish.

We find that concentrated carbolic acid applied heavy on paint or varnish acts very well on small spaces, especially in a horizontal position. But on large surfaces, and especially on a vertical surface, a medium to hold on in a heavy layer is required to make it act. Soft soap, strongly caustic, is the best material to mix with the carbolic acid, but great care is necessary to avoid contact of the hands with either the acid or the mixture. It has been said for exterior work, where the refined acid is too expensive, the crude article will serve as well in admixture with soft soap, but it appears that here the latter does the actual work rather than the acid, because trials demonstrated that on the same paint the soap alone acted more rapidly than the mixture. The soap alone, however, raises the grain of soft wood, while the mixture does not. In short, our opinion of carbolic acid as a paint and varnish remover is not an exalted one, for the reason that the material is rather expensive; that it penetrates too deeply to admit of immediate repainting, and on account of its odor. There are several paint removers on the market that are highly recommended; why not try one or several of these?

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Proportion of Linseed Oil Required to Grind Certain Pigments Into Paste.

In the following we shall give the average percentage of oil in one hundred pounds of paste, because no strict rule can be laid down, the percentage of oil required depending on the condition of some of the pigments and fineness of grinding:

- White lead, pure, eight or nine per cent.
- Red lead, pure, twelve per cent.
- Sublimed white lead, ten per cent.
- Zinc white, French, sixteen per cent.
- Zinc white, American, eighteen per cent.
- Whiting putty, sixteen per cent.
- Barytes, from eight to ten per cent.
- Whiting paste, twenty per cent.
- China clay, twenty-three per cent.
- Silica, or silex floated, twenty-five per cent.
- Terra Alba, twenty-two per cent.
- Drop black, fifty per cent.
- Lamp black, sixty-five to seventy-two per cent.
- Gas black, eighty to eighty-four per cent.
- Mineral black, thirty-five to forty per cent.
- Graphite, or plumbago, thirty to thirty-five per cent.
- Chinese, or Prussian blue, fifty per cent.
- Ultramarine blue, thirty per cent.
- Mineral brown, twenty-two to twenty-five per cent.
- Vandyke brown, forty-five to fifty per cent.
- Burnt sienna, Italian, fifty per cent.
- Burnt sienna, American, thirty-five per cent.
- Raw sienna, Italian, fifty-five per cent.
- Raw sienna, American, forty per cent.
- Burnt Turkey umber, forty-two to forty-five per cent.
- Burnt umber, American, thirty-five per cent.
- Raw Turkey umber, forty-five per cent.
- Raw umber, American, thirty-five per cent.
- Chrome green, chemically pure, from twenty-six to thirty-five per cent., according to shade.
- Chrome green, commercial grades, from fifteen to twenty-three per cent., according to shade, the lightest shades requiring least.
- French ocher, thirty to thirty-three per cent.
- Yellow ocher, American, twenty-eight to thirty per cent.
- Oxford ocher, English, twenty-five to thirty per cent.
- Indian red, twenty per cent.
- Red oxides, twenty-three to twenty-five per cent.
- Venetian red, twenty-three to twenty-six per cent.
- Tuscan red, twenty-five per cent.
- Rose pink, thirty to thirty-five per cent.
- Carmine, French, fifty to fifty-five per cent.
- American vermilion, twenty to twenty-two per cent.
- English vermilion, fifteen to eighteen per cent.

Artificial vermilion, usually fifteen per cent., but ranging as high as thirty per cent. in some brands of light specific gravity.

Light chrome yellow, twenty per cent.

Medium chrome yellow, twenty-six per cent.

Dark, or orange yellow, twenty-two per cent.

Yellow lake, French, thirty-eight per cent.

In the list given we refer to pure pigments only, excepting where otherwise stated, as in the case of commercial chrome green.

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Copper Paint for Ships' Bottoms.

We assume that this refers to the copper paint used for protecting the bottoms of wooden vessels against the accumulation of sea growth and barnacles, that tends to impede the progress of the ship. We would say that the formulas for these paints are proprietary, at least those that have a large sale, and that ship owners do not take kindly to experimenting with new brands and seem inclined to favor established goods, though even these fail sometimes to give satisfactory results. As far as we can learn, the best copper paints consist of oxide of copper, ground fine in such a medium as pine tar and crude turpentine and reduced to proper consistency for brushing with spirits of turpentine, rosin spirit or other kindred solvents. Some brands, we believe, have creosote in addition, but it is said that this is not a good feature. Some experimenting with the materials named will be necessary, if success is to be attained.

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To Make White Lead Dry a Dead Flat on Walls.

We are told by several experienced painters that the addition of a very small portion of clear water will accomplish your purpose. Beat up your keg lead first with a paddle, then stir in your water until it unites with the lead, add your coloring matter and drier and reduce to working consistency with pure turpentine. The small portion of water present in the paint will do no harm, as it will evaporate as the paint dries.

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How to Mix Freestone and Ivory Tints and Various Greens.

Freestone is, as near as we can describe it, a sandstone of the reddish drab variety, but any stone that is of the sandy or gritty variety may be termed freestone. The nearest approach to the color will result from a mixture of ten parts white lead, five parts French ocher, one part Venetian red and one-half part lampblack. Ivory can be produced by mixing one part of raw sienna with 100 parts of white lead. When cost is no object, and a fine, clear tint is wanted, two parts French yellow lake, one part of first class raw Italian sienna mixed with 97 parts of white lead (or zinc white for inside work) will bring about excellent results.

Subdued green can be made by mixing Prussian blue and lemon chrome yellow, adding raw umber and a little white until desired effect

is obtained, or the raw umber and white may be added to commercial chrome green, or Brunswick green, as it is termed in Europe. Moss green is made by mixing Prussian blue, medium chrome yellow, raw umber and white or chrome green with raw umber and white. Proportions vary according to the strength of the various colors used. Silk green can be made by mixing Prussian blue with lemon chrome yellow and French yellow lake. If the latter is too expensive, use Dutch pink instead. Proportions required depend on the depth of hue and richness of color desired.

Greenstone is made from white lead or zinc white chrome or Brunswick green and drop black.

— 291 —

Cause of the Cracking of Grained Work.

This subject has been under discussion in a master painters' organization and various reasons were given by experienced men. Some of the speakers laid the blame on green varnish, others on the fattiness of the graining color and others again on the ground being too oily. Boiling down the various opinions, we take it that in order to prevent grained surfaces from both peeling and cracking, the ground color should be pure keg lead, tinted with oil color to suit, thinned with turpentine and liquid drier only, so that it will dry flat as possible; when oil color is used for the graining it must not be fatty, but fresh goods, thinned with turpentine and drier only, as the colors contain enough oil for binder at any rate.

Lastly, the graining should be allowed to stand at least two months before being varnished over, and even then a heavy varnish must not be employed, but a light bodied outside varnish or a varnish that has been cut with turpentine.

— 292 —

Amount of Japan Drier to Be Used in Paint.

This depends very much on the nature of the pigment used in the paint, as well as on the strength of the drier itself and on the time allotted for drying, as well as on the application. Oil paint that is brushed out well and uniformly will dry hard in the same space of time with one-half of the quantity of drier as a coat that is laid on heavy. A good oil and turpentine liquid drier that is free from rosin is the best article to select, and we would say that where the paint consists mainly of pure lead one-half pint or drier to $7\frac{1}{2}$ pints of raw linseed oil is sufficient to make the paint dry in from 18 to 24 hours in moderately dry weather. In very hot weather this quantity can be reduced to one-half, while in cold and damp weather it should be doubled. When the paint consists of mineral pigments, such as mineral brown, red oxides, Venetian red, ocher, etc., one pint of japan or liquid drier to seven pints of raw linseed oil is not excessive, and in blacks, bronze greens, Vandyke brown, etc., even a larger quantity is required. When boiled linseed oil is being used, instead of the raw oil, it is again necessary to find the drying quality of this boiled oil in order to ascertain how much, if any, additional drier is needed. You

will see that no rule can be laid down for the painter to go by, and that you will have to experiment in order to see with how little drier you can get along, always remembering that the addition of drier does not enhance the wearing quality of paint.

— 293 —

Quick Drying, Colorless Varnish for Silver Articles.

A formula for a preparation that will effectually protect silver and similar metal from tarnishing is given by Richard Hale in an exchange, as follows: Soluble guncotton, one-eighth Troy ounce, five ounces amyl-acetate, two ounces petroleum spirit, one ounce wood naphtha, placed in a small glass bottle or jar until guncotton is dissolved and filtered.

Care must be taken in preparing this varnish and it must be kept away from any flame, it being very combustible. Before it is applied to the metal the latter must be cleaned and polished in the usual way.

If the preparation is too troublesome for you, we would advise you to try the bronzing medium, sold under the name of banana oil, which you can obtain from any dealer in bronzes, etc.

— 294 —

Imitation of Gold Color for Lettering.

The Standard Dictionary gives the formula as 11 parts white, 42 parts orange and 47 parts yellow. But almost every painter has his own way of mixing paint in imitation of gold. The best imitation we have seen was made from 60 parts by weight of flake white in japan, 33 parts lemon chrome yellow in japan, 5 parts deep English vermilion in oil and 2 parts burnt sienna in oil. A paler imitation of gold was made from 65 parts flake white, 32 parts lemon yellow, 1 part light chrome green and 2 parts burnt sienna, all ground in japan. A strong gold color, that will work out light and free under the stripping pencil, may be made from medium chrome yellow, zinc white and a trifle red. For old gold, mix deep orange yellow with French yellow ochre.

The best plan is to practice some, having some gold lettering or striping that has been varnished over for a guide, matching as close as is possible with paint.

— 295 —

Best Way to Paint Floors of Kitchens and Porches.

It is almost impossible for a paint maker to produce a paint to suit any and all conditions of floors, because the kind of lumber differs in various localities and floors are subjected to different usage. In kitchens where much washing is done, the soap suds are allowed to remain on the floor for hours and act as a paint remover in a slow, but certain manner. And very frequently, instead of such floors being simply mopped up, they are scrubbed energetically with soap and brush. Porch floors are painted regardless of the moisture from underneath and without a suitable priming.

We would suggest the following for kitchen floors: If the floor is old and has not been painted before, have it well cleaned and allow to dry. Get all the dirt out of cracks and nail holes, then prime with equal parts linseed oil, japan and turpentine. When dry, putty up all cracks and nail holes with putty colored like the subsequent coats of paint. Use equal parts lead and zinc and mix it so as to dry flat on first coat, but for the finish use equal parts of rubbing varnish and turpentine. This will give you a half gloss and will wear well. For a new pine floor, prime with white lead and oil, applying it thin, putty up and proceed as with the old floor. For maple or other close grained wood, proceed as for new pine, but oak floors should be first filled with paste hardwood filler and then painted as above. For porch floors, prime with pure white lead, thinning with boiled oil; when dry, putty with material the color of your paint. Succeeding coat should be based on pure lead in oil, but finishing coat should contain some zinc white in order to give proper hardness. Brush out each coat to the utmost and give plenty of time between coats and do not hold the last coat too oily.

— 296 —

Lithopone White.

Lithopone, or Lithophone, as it is sometimes spelled, is a sulphide of zinc white, while what we know as zinc white is oxide of zinc.

It is a compound of zinc sulphide and barium sulphate, and was not originally intended for the use of the painter, although it has now replaced white lead as well as zinc white in some industries where these pigments were once largely used. Charlton white, Griffiths white, patent zinc white, are all of similar composition, and the material is also produced in this country under various names. The foreign importations of lithopone are offered in three or four grades, as green seal, red seal, blue seal and yellow seal, the green seal being whitest, finest and most opaque. The specific gravity of this pigment is between that of white lead and zinc white, and its body or covering power superior to that of ordinary zinc white. While it is unaffected by sulphur gases, etc., and therefore a stable pigment for use about chemical laboratories and for interior use generally, it does not stand exposure to sunlight as well as white lead or zinc, and is very apt to blacken when used on exposed surfaces. Nor can it be mixed with white lead or Paris green or any pigment having lead or copper for its base, because of the double decomposition that is liable to take place in such mixture. When lithopone is mixed with water or oil or pale varnish and applied as a paint on surfaces exposed to sunlight, it will on drying assume a decidedly grayish tint, which turns white again over night, returning to gray again during sunlight exposure, and this will alternate until the paint has become thoroughly hard. It is, therefore, not a safe, all around pigment for house painters' use.

— 297 —

Method of Staining Oak Black.

The most effective way to stain oak black, making the stain penetrate deeply into the wood, is to take iron filings, place them

into a strong stoneware pitcher or strong glass jar, pouring over this a mixture of equal parts of oil of vitriol and soft water, stirring the decoction frequently with a glass rod or wooden stick until the liquid has assumed a greenish color. This liquid is applied to the oak repeatedly until the black effect desired is obtained, and then the surface is rinsed with weak soda water, and finally with clear water and allowed to dry. The solution should be applied with a swab made by tying old cloth around the end of a stick, and great care taken to keep the acid from touching the hands, face or clothes. Nor should the solution be allowed to stand about the shop, except it be properly labeled as to contents, and well covered.

This makes a good neutral black stain, neither of the bluish tone of the aniline blacks, nor the brownish tone produced by other decoctions.

If a deeply penetrating stain is not required, a decoction made by boiling green walnut shells in water may be substituted, but four or five applications will be required. A nut gall solution, to which a trifle of sulphate of iron (copperas) has been added, also produces a good stain, but none will penetrate so deeply as the first mentioned.

— 298 —

How to Paint a Whitewashed Brick Wall.

An engine room had received two coats of lime whitewash with plenty of salt. This coating did not brush off easily, and the owners wished it painted. The temperature of the room is about 75 deg. F.

If the whitewash has been applied recently, say within two or three months, it is best to scrape off as much as possible and give the wall a wash of strong vinegar and let it dry. If the whitewash is over six months old, give it a good brushing down with a stiff broom so as to remove all that is scaly, and then give the wall a wash of white lead, using about nine pounds of keg lead to five pints of raw linseed oil, one-half pint turpentine and one-half pint good liquid drier that is free from rosin or gum. This wash will penetrate into the wall, binding the remaining whitewash so that it will not peel and take succeeding coats along with it.

Now putty up joints, if a good, smooth job is desired, using good linseed oil putty, to which add some dry white lead and a little drier.

On this flat surface give another coat of white lead, which should be held half flat, if a gloss coat is to be given as the finish. For a job to stand frequent cleaning, as is the case in the walls of an engine room, it is best to finish with a coat of zinc white that has been mixed with a pale, hard drying varnish. You need have no fear of the effect of the limewash upon white lead paint if you neutralize it with the vinegar wash referred to, nor if the limewash is over six months old. After you have the whitewash securely bound to the wall with the first coat of lead, as noted, you may proceed as you would in painting a plastered wall.

— 299 —

A Bronzing Liquid That Will Hold Up Heavy Bronze.

A bronzing liquid was wanted for bronzing picture frames with heavier or cheaper varnishes. The inquirer had tried varnish reduced

with turpentine, but the powder immediately precipitated and did not have a metallic luster after application.

You cannot expect heavy bronze to hold up in a thin liquid of such consistency as is required to allow the bronze to spread and flow out well and yet have a good luster. Nor can you expect that heavy bronze will mix with a stout liquid and keep from hardening when once settled in the pot. The best bronzing liquid is one that hardens most rapidly throughout, because it does not give the bronze an opportunity to oxidize, which is proved by the fact that bronze which is baked on by heat has the best luster and retains it longest.

We would suggest a mixture of equal parts of gold size japan or coach japan and a good grade of pale coach varnish, thinned with pure spirits of turpentine, to which is added only enough bronze to give the luster desired, and only enough mixed at a time as can be worked up, in say fifteen minutes or so. If it sets too rapidly under the brush to admit of free application, dissolve some white or yellow beeswax in hot turpentine (in a water bath) and use this for thinning the japan and varnish in place of the clear turpentine, but one ounce of wax is sufficient for one quart of turps.

A quick bronzing liquid that will keep bronze powder soft, though it will settle quickly, may be made by dissolving three pounds of pale orange shellac in one gallon wood alcohol, adding two ounces of gum camphor, straining the solution through fine muslin or cheesecloth. This liquid will require no more than one-fourth of its own measure of bronze, and the preparation must be deftly applied, as it will rub up again if gone over too often with the brush.

— 300 —

Mucilage for Labels on Tin Cans.

Mix four parts by measure of commercial silicate of soda (water glass) and only one part by measure of pale syrup. If not thick enough, add sugar until it is of proper consistency.

— 301 —

Fireproof Paint.

We do not believe that a really fireproof paint is or has ever been in existence. From the materials suggested in the following, we think, however, that the preparation is fire resisting, though we cannot see how it would stand, as is claimed, exposure to all sorts of weather for thirty years. The formula as published is: Equal parts by weight of common salt, alum, silicate of soda (water glass) and tungstate of soda are mixed with four parts of lime and all ground fine in enough boiled linseed oil to make a stout paint, which is applied in the usual manner.

— 302 —

Coating the Inside of Bakers' Delivery Wagons to Prevent Bulging.

We do not think that this feature comes within the scope of the painter, but rather belongs to the wagon builder. Sheathing, similar to that used in railway baggage cars, should be employed

on the inside of such wagon bodies and tops. The sides and top could be lined with sheet zinc, placing roofing felt or similar material between the wood and the sheet zinc. As paint, however, does not well adhere to zinc, the surface requires treatment to make the paint hold on, which can be done by first giving it a wash of the following solution: One part, by weight, each of chloride of copper, nitrate of copper, sal ammoniac, dissolved in 64 parts of water. Do not use a tin pot for making solution, but an earthen or glass vessel. When solution is made, add one part of commercial muriatic acid and apply with a flat brush. The zinc will blacken, but on drying out there will be a gray film, on which any paint will adhere. Coat with flat drying paint and varnish over with good, hard rubbing varnish.

— 303 —

Repainting Soft Brick That Has Shelled.

We do not know of anything that will prevent brick from shelling or chipping, because this is mostly caused by defective material in the brick or defective manufacture of the same. Soft brick will absorb much more moisture than hard brick and neither should ever be painted, excepting after a prolonged dry spell, because the moisture that is kept in the brick by the paint will freeze during cold weather, expand and make the paint scale and the brick shell off or chip. For repainting under such conditions, we can only give you this advice: Do it only at the owner's risk, unless after a long dry spell in summer; clean the surface down well, removing all loose paint and shell of brick; give a good priming of raw oil with very little pigment in it and when dry, putty up. If you can afford to give three coats, make your second coat stout, using part pure white lead (at least one-third), thinning with two parts raw oil and one part turpentine and drier; use it stout, but rub well into the brick, then apply your finishing coat, as you like, flat or glossy, but in the latter case, use good boiled linseed oil. If you must get along with two coats, see that you get some lead in the priming.

— 304 —

Enameling the Interior of a Refrigerator in White.

The specifications for finishing the inside of a large refrigerator in white enamel provided that nothing should be used which would give off any odor, and that it must resist hot or cold water, acids, lye, etc.

Your specifications are such that we do not care to give you any suggestion and accept the responsibility for its success or failure. We rather believe that there is no so-called enamel paint that will withstand all that you mention, real enameling being the only process that can be depended upon under such conditions. You do not mention what the interior of this particular refrigerator is lined with, and as we presume the material to be sheet zinc, we would say that you must prepare this surface with the solution referred to in No. 301 and then give a coat of zinc white in oil, thinned with turpentine, and let it dry hard, then sandpaper smooth. If this does not cover well, give another coat, which also sandpaper smooth. Saturate some of the

best French zinc white with pure grain alcohol and pass it through a fine strainer into a solution of bleached shellac in pure grain alcohol, stirring constantly to prevent lumping. This will give you a quick white coating that will lose all odor in a very short time, but which must be used immediately after being mixed, as zinc white rapidly disintegrates shellac or spirit varnishes. As before mentioned, we do not assume any responsibility in making this suggestion.

— 305 —

Staining and Finishing Store Fixtures in Dark Oak That Have Been

Stained and Finished in Cherry.

In order to make any kind of a job, you will have to remove the varnish first, either by sandpapering or with varnish remover (and we should suggest a mixture of aqua ammonia, two parts, and turpentine, one part), which will probably remove the stain, also, especially if it was a water stain. If this should be the case you'll have clear sailing, as the stain that remained in the grain of the wood only will not interfere much with your dark oak stain. Should you, however, be unsuccessful in removing the cherry stain, you will have to make your dark oak stain on a different plan, more in the nature of a paint than a stain, and you will have to leave out red entirely from your mixture, making it on the antique oak plan, because the red from the cherry stain will give the proper blend. In the latter case you will require extra binders and driers in your staining preparation, as it cannot penetrate into the wood as well. We cannot give you any advice on the finishing, as you have not informed us what grade of a job you expect to furnish your patron with, but would advise you to use a very high grade of varnish, because such fixtures are subject to considerable wear.

— 306 —

Stains in Freshly Kalsomined Walls and Ceilings.

The walls and ceilings of a public building had been rough plastered with adamant three months before they finished with two coats of a cold water kalsomine. The painter was told that with this preparation no size was necessary, but found, no matter how much he applied for first coat, the surface absorbed all, yet on applying the second coat, two days afterward, the paint worked as sleek as if over oil paint and promised to make a nice, uniform job, but when it dried out it was badly spotted and stained. The building was not heated and the glazier was putting in the sash while the painting was going on.

In the first place you should have used a size unless you were acquainted with the properties of the cold water paint from previous experience. It is not always safe to depend upon the claims of a label, especially where a large job comes into question. The cause for the spotting may be manifold, as for instance, the building not being heated, the first coat of paint may not have been dry or hard enough, or the plaster may have been entirely too porous to allow the paint to dry out uniform without sizing, or it may have been due to a fault in the paint itself. Whatever may have been the cause we would

advise you to apply a size made as follows: One pound pale glue, one pound good bar soap and two pounds pulverized alum, each separately dissolved in one quart of boiling water. First mix glue and soap solutions, then while continually stirring add the alum solution and finally cold water enough to make a gallon of size. Apply the size cold and on top of this your kalsomine, or cold water paint, but if you do not care to risk this again, then prepare your own kalsomine, formulas for which you will find elsewhere in this book. It is possible, however, that the spots may be due to the peculiar action of adamant plaster, which is extremely difficult to paint upon, especially before it has become thoroughly dry and seasoned. This plaster sets hard at once, but it does not become bone dry as quick as ordinary plaster. Unless the laths are nailed with galvanized nails, adamant will act on the iron and cause stains which will show through any subsequent coats of paint or kalsomine after the plaster has dried out.

— 307 —

Prepared Paste for Paper Hangers.

We do not know of any prepared paste for paper hanging that we should care to recommend, but in the following you will find something that is portable, and will serve the purpose very well. Place one quart of water, as hot as the hands will bear, into a pail and add a tablespoonful of pulverized alum. Have best wheat flour sifted and put into the water, stirring it with the hand and work it as you would in making dough for bread until it is so stiff that you cannot beat it any longer. Have a clean paddle or stick and plenty of boiling water ready, which pour rapidly into the pail, stirring in the meantime until the paste begins to turn or cook; then stop pouring in water, but continue to stir the paste until cooked. Paste cooked too much will not hang, hence the pouring in of water must be stopped at the turning point, which happens when it begins to lose its whiteness. Level off the paste, pour cold water over the top and let it stand over night, when in the morning it may be cut into hunks that can be wrapped in strong brown paper and carried in the grip. On reaching destination, you can borrow a pail, thin the paste with water and it is ready for use.

Thick paste like this, before it is thinned, will not mold or sour for months, except in very hot weather.

In making this paste, as well as the ordinary ready paste, care must be taken to have it free from lumps.

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Cause of Paint Cracking and Peeling on the Sheltered Portions of Dwellings.

A house built in 1890 was painted with yellow ocher and allowed to remain for two months, then painted white with two coats of strictly pure white lead and linseed oil. In 1899 it was again painted white with ready mixed paint, which was found by analysis to contain 75 per cent. zinc oxide in the pigment, and mixed with strictly pure lin-

seed oil. In 1901 the paint started to crack and peel off, especially where it was protected from the sun under the porches, etc.

During the past ten years or so, many experienced and observing painters have pointed out the effects of priming with yellow ocher alone, and have recommended that when ocher is to be used for priming it should be mixed with from 50 to 70 per cent. of pure white lead and thinned with pure raw linseed oil only, or at most with the minimum quantity of drier. Ocher, consisting for the most part of silica or sand, is at best a brittle pigment and cannot hold its own with white lead as a priming. When covered with an elastic white lead paint, it will remain fixed longer than when a more brittle paint is used over it, but sooner or later it will "split," throwing off the top coats of paint. If this has happened in your case, you can determine by examining the back of the peeled off strips of paint, as well as the bared wood, both of which would show a yellow color. We believe that the lead paint had perished to such an extent that the lead and zinc paint obtained a direct hold on the ocher priming, which had also lost its adhesion to the lumber, and there not being oil enough for all caused the cracking and subsequent peeling or scaling. The only other cause that the trouble could be attributed to would be a damp surface on painting.

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Repainting Golf Balls.

We haven't much experience in that line, but would say that the balls must first be cleansed, which is best accomplished by soaking them in strong solution of sal soda until the old paint has fairly well disappeared, or at least softened, so that it may be removed with a scrub brush. Rinse in clear water, wipe with a dry cloth and allow to dry so that the rubber composition becomes hard again. To repaint balls white, mix equal parts of lead and zinc in oil, thin to stout consistency with a good elastic coach varnish, adding a little ultramarine blue to take off the yellow cast given to the white by the varnish. For the red, thin dark orange chrome or vermilion, or a mixture of these in a like manner. If you want to have the paint elastic enough to stand the wear, you must not use drier in the paint, but give it plenty of time to dry. To keep it from remaining tacky, however, you may find it necessary to employ driers, and in that case we would suggest to use a good paste drier. A little experimenting on these lines will tell you more than volumes of suggestions.

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How to Produce Ivory White.

Tint any clear white lead or zinc with a trifle of raw sienna until you have the desired effect. Or if you wish to have a very clean effect, use a trifle of yellow lake in place of the sienna.

— 311 —

How to Prepare and Apply Blackboard Slating.

To make a good blackboard, the surface must be prepared in the proper way. On a plastered wall give a coat of glue size

first, rub this down lightly with fine sandpaper, then moisten lampblack with alcohol, making a paste and stir enough of this into shellac varnish to give body. Apply this over the glue size evenly, and when hard rub it with pumice and water. On wood, omit the glue size, but give two coats of the shellac and lampblack mixture, and sandpaper lightly or moss down with pumice and water. Then give two coats of the following: Dissolve $\frac{1}{2}$ pound brown shellac in 2 quarts alcohol, add $1\frac{1}{2}$ ounces of dry lampblack, $1\frac{1}{2}$ ounces ultramarine blue, 4 ounces flour of emery and 6 ounces flour of pumice. If too stout to work freely, thin with alcohol. Such a blackboard may be written on with soapstone pencils as well as chalk. Remember that the preparation must be applied rapidly to prevent laps.

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Formula for Carriage Top Dressing.

What effect will oxalic acid, used in bleaching a piece of wood, have on the varnish used in refinishing it?

If you desire a quick drying, lustrous black enamel for carriage tops, prepare it as follows: Melt nine pounds of best asphaltum with one-half pint of boiled oil, being careful not to let it boil over, take to a safe distance from the fire, and while stirring the mass add gradually one-half gallon spirits of turpentine.

If you want something that will preserve leather regardless of high luster, melt one-quarter pound of beef suet with one quart of neatsfoot oil and add two tablespoonfuls of melted beeswax, mixing all carefully and place in a well covered vessel until wanted. If wanted black for covering up worn places, add some finely powdered drop black, which is best done when the dressing has been warmed up.

— 313 —

Effect of Oxalic Acid on Varnish.

If you wash the surface with strong vinegar after you have restored the natural color of the wood by an oxalic acid solution and give it time to dry out thoroughly, it will have no effect whatever on your varnish or its wearing qualities.

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Cleaning Brass Before Buffing.

This, when done on a large scale, is accomplished with revolving brushes, but to do it occasionally only and in a small way, we would recommend the use of a paste made from one-half ounce oxalic acid, powdered, three ounces of powdered rotten stone and one-quarter ounce pulverized gum arabic, mixed with sweet oil. Apply and rub on the metal well with a stiff brush and wipe dry with woolen cloth.

— 315 —

Wax Finish for Various Kinds of Wood.

The following method is for a first class finish, regardless of cost: For the very best class of wax finish, see that your wood

is smooth finished and well dusted. Fill the open grained woods with paste hardwood filler in the usual way, and when dry sandpaper. Then give two coats, at least, of shellac varnish, rub down well with fine flint paper and apply two or three coats of best polishing varnish, rub the last coat when thoroughly dry with pumice and water. When this is well cleaned and dry, polish with wax. This is best prepared by melting pure beeswax and linseed oil together, thinning with spirits of turpentine. One pound yellow beeswax, one-half pint of raw linseed oil and one quart of turpentine will make a wax polish of the consistency of ointment that will not scratch the finish. Follow the same method for the close grained woods, but omit the filler, as the shellac will accomplish that purpose. The very cheapest method of obtaining a wax finish is to oil the wood, fill the close grained woods with cheap paste filler and apply the wax finish after sandpapering.

For pine, however, we would suggest at least one coat of shellac varnish, even in cheap work, to keep in the sap. This coat should be applied after the oiling has become hard, and if the shellac is put on woods you have mentioned, oak and redwood are the only ones re-thin and uniform, sandpapering or rubbing is not required. Of the quiring paste filler.

For maple floors it is best to apply two coats of white shellac varnish after cleaning up with turps, rubbing the last coat of shellac with pumice and water, and when dry the wax floor polish mentioned above is applied with a brush and polished with a horse brush or floor polishing brush.

For a cheap finish, clean up the floor with turpentine, omit oil from the wax polish, melting the wax and thinning it with turpentine while hot, applying it directly to the wood in the same manner as noted above.

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How to Prepare a Good Photographers' Paste.

We have been informed by competent authority that the best photographer's paste is made from common wheat starch, and would, therefore, suggest that you try the same. This paste must not be cooked, but prepared in the following manner: Place a quantity of the starch into an earthen or porcelain dish, break up the lumps into a fine powder, and pour over it slowly boiling hot water, beating the starch with a wooden spoon or paddle into a soft batter, which, if there are any lumps, strain through cheesecloth or other coarse cloth. On cooling, the paste should have the appearance of lard; if too thick, thin with more boiling water.

— 317 —

Best Method of Painting or Enameling Zinc Bathtubs.

In order to make your paint hold on the zinc, you need a wash which will produce a film to which oil paint will adhere. First, remove all grease, etc., from the zinc lining with a solution of soda or ammonia, and dry the surface thoroughly. Then apply with a wide, soft brush the following preparation, which any druggist will make for you: One part by weight of chloride of copper, one part by weight of

nitrate of copper, one part by weight of sal ammoniac, dissolved in sixty-four parts by weight of water. When dissolved, add one part muriatic acid. This solution must be kept in glass or earthenware, as it will not keep in tin. This solution will dry in about twelve hours, producing a grayish-black film, on which any kind of paint will hold. However, because of the hot water and soap used in bathtubs, an all-oil paint will not answer well, and only the first coat should contain sufficient oil for binding, while for the finishing coat, especially, a gloss paint, made with good hard varnish, will serve best.

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Re-Japanning an Old Japanned Tin Box.

To make a good job of such work will put you to more trouble and expense than the box is worth, as you will see by the following: First, you will have to remove all of the old japanning, then make a japan flow as follows: One pound gum sandarac, two ounces each of balsam of fir, balsam of tolu and sugar of lead and one-half pint linseed oil are placed in a suitable kettle over a slow fire at first, which is then raised to a higher heat, until all are melted. Now the kettle is taken from fire and allowed to cool somewhat, when under continued straining two quarts turpentine are added, and the whole strained through fine cloth. This is transparent, and to make the black japanning, one pint of this japan flow is added to a mixture made as follows: Two ounces of asphaltum are melted and thinned with one-half pint of turpentine and one-half ounce of Prussian blue in japan added, all of which must be strained and applied with a soft flat brush. This being too long-winded a method for renewing one single article, we would suggest that you sandpaper down the surface and apply baking enamel black, placing the box in an oven with a heat of about 212 deg. F. for three or four hours.

— 319 —

Preventing Ingrain Paper from Drying Out Spotted.

An inquirer desired to know how to prevent ingrain paper from drying out spotted? Nearly all shades go the same way, although plain flour paste, without alum, was used, and the walls were in good condition.

Not having seen the paper, we cannot say whether it is faulty or not, and while you say that the walls were in good condition, you do not mention having used paperhangers' size. Before hanging ingrain paper, the walls must be prepared, whether they be new, old papered, kalsomined or whitewashed. If the walls are new, they must be sandpapered to remove all specks, to keep them from showing through when the work is finished, and a coat of thin glue size applied as hot as possible to prevent uneven suction or absorption of the paste.

All old papered, kalsomined or whitewashed walls must be thoroughly cleaned and washed, all cracks stopped and projections scraped down level, then a coat of glue size given, as in the case of new walls.

If there are any ceilings to be papered, prepare them same as the walls and hang them first, because you will in this way prevent the walls from being soiled.

The paste to be used should be good wheat flour paste, with or without alum, such as is made for ordinary paper, but thinned down much more, almost like water, so that when the pieces are separated for hanging they barely show the presence of paste. Shade the different rolls before cutting up your stock, and should any of the paper look darker or lighter, be sure that the change from one roll of paper to the other comes in the corner, where it will not show. We believe, however, that your trouble of the paper showing spots is due to uneven suction in the walls.

— 320 —

How to Hang Burlap on Board Walls.

While it is a difficult problem to hang burlap on a board wall or ceiling when the lumber is not well seasoned, we do not see why the burlap should bulge out at the points if you follow the rules for hanging it on such surfaces, unless the lumber should warp and crack in places. In such cases there is no other preventative except to let the lumber become thoroughly dry first, then plane off all projections and fill in the cracks and joints. The part of wall that has been painted must be glue sized, as well as the new part, and it is well to add some washing soda to the glue size that goes on the paint, in order to cut it somewhat. The burlap should be trimmed in such widths that the joints (of the burlap) always come in the center of a board. Paste the wall, one width at a time, with a good, strong paste that is free from lumps and put the burlap on dry and use a roller. Run the burlap the same way as the boards, and roll the edges down well after each width is put up, and sponge the surplus paste off immediately with warm water. Make your paste by dissolving one pound of glue in two gallons of water, and put in enough paste powder to make a stiff paste, then add to the warm paste two tablespoonfuls of Venice turpentine and stir well.

Should any place in the joint open up after the paste has dried, use filling in made by mixing plaster of paris with white shellac varnish. We do not think that the pasting of heavy clapboard paper would assist you to any extent.

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Removing Whitewash from Ceiling Before Kalsomining.

Soften the whitewash by wetting it liberally and repeatedly with a solution of two pounds potash in five gallons of water, and when softened, remove with a scraper.

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How to Finish the Bar of a Saloon.

If we had been given particulars or details as to what kind of wood the bar is made of, especially the front and top, also whether there is a handrail around it and whether there is any carved work, etc., we could have answered this question much more intelligently. However, we will do the best we can and assume that it is new work and

that the wood is either oak, mahogany or walnut. You may leave it either natural finish or stain it to enhance its richness; in the latter case, stain your wood before filling it, but in any case use a good paste filler that is stained to match the wood or the stain used. The wood being filled, sandpaper lightly with the grain, then give at least one good coat of shellac all over, which, when hard, sandpaper again and give the front two good coats of best inside rubbing varnish, rubbing or mossaing the last coat with pumice and water and finish with one coat of high-grade cabinet varnish, which, when dry, rub with flour of pumice and water lightly; clean off thoroughly and polish with rotten stone and sweet oil. As for the top of bar and handrail, give at least two additional coats of best shellac varnish, rub with pumice and oil until you have obtained a perfectly level surface, and polish with rotten stone and sweet oil.

Should the bar consist of close-grained wood, you can, of course, omit the filler, staining the wood first and applying the shellac varnish as soon as the stain has dried.

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Lacquer for Brass and Its Mode of Application.

The formulas for spirit varnishes referred to by you were not published as lacquers for brass, but for general ornamental work, the idea being more to show what is to be expected of such varnishes, than to recommend them for practical work. In lacquering brass, the metal must be cleaned from all grease, etc., by the use of the following or a similar paste: One ounce oxalic acid, six ounces of rotten stone, one-half ounce of gum arabic or dextrine are made into fine powder and mixed to a paste with sweet oil. This is applied to the brass and rubbed dry with a flannel, then with another clean dry piece of flannel or woolen cloth the surface is polished. To make a good brass lacquer, mix one pound pale orange shellac, four ounces turmeric, one ounce annatto, one-half ounce saffron in one gallon 95 per cent. grain alcohol, let all digest, then filter through asbestos fiber to clear. Before using the lacquer on a large surface, try it on a small piece of brass, and if the finish appears cloudy the lacquer may require thinning, which can be done with more alcohol. Remember, the metal must not be too cold when lacquer is applied, and it may be practical to put it in a water bath during use. Lacquered brass should not be polished with the usual polishing mediums, as they will simply take off the lacquer sooner or later. Dusting off or wiping with a moist chamois leather is all that is required to keep it clean.

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Difference Between Venice Turpentine and Crude Turpentine.

Venice turpentine is a balsam, similar to balsam of fir or Canada balsam, and a thick liquid of syrup-like consistency, imported from France, while the crude turpentine is a thick, soft, white substance, known as ink turpentine, or gum thus, and is only worth one-tenth of the price of Venice turpentine.

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Paint to Prevent Tin Cans Rusting in Water.

It has long since been determined by scientific researches that linseed or any other oil is not impervious to water; on the contrary, that they soak up water almost like a sponge, hence some other preparations are required to protect metal from rust in the presence of water. We should recommend that the cans be first thoroughly cleaned to remove all grease, etc., with soda water, then rinsed and thoroughly dried. Now a thin coat of equal parts white lead and zinc, thinned with turpentine and a little coach japan, to which good varnish—say a tablespoonful to each half pint of paint—is added, should be given, and when this is dry a coat of enamel made from zinc in damar varnish, colored to suit fancy, thinned with a little turpentine and mixed with sufficient hard drying coach varnish to work freely, applied as a finish. If each coat could conveniently be baked from four to six hours at a temperature of about 150 deg. F., it would resist water far better than the air-dried paint. We should point to our advertising columns, where the firms manufacturing such preparations announce their goods, and it may be much more convenient to consult them than to experiment along these lines.

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The Best Paint for Metal Roofs.

We do not recommend any particular brand of paint for this purpose, but would say that a great deal depends upon the condition of the metal, upon local conditions and upon the quality of the paint. Graphite, mineral brown, red oxide, Venetian red and even coal tar have given more or less satisfaction, and we believe that if graphite, metallic paint or Venetian red are well prepared and mixed with a first-class oil and not overdosed with driers any one of these will stand well on a tin roof and protect the same from rust, always provided that the tin has not already rusted, that it is well cleaned from rosin, dust and grease, and that local conditions—such as the precipitation from neighboring factory chimneys, cinders, passing locomotives, etc.—do not assist in the early perishing of the paint. A painter cannot well guarantee the durability of the paint on a roof that has been painted before when he considers what trash is often applied to new roofs, the cheapest kind of mineral mixed from the dry with rosin or mineral oil, often thinned with kerosene oil to make it spread.

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The Settling of White Lead in Oil in Packages.

This will happen to the purest and best white lead in oil on long standing, and is due in such cases to the high specific gravity of white lead, the oil not being of sufficient body to hold all of the lead in suspension. In rare cases this may be aggravated by the coarseness of the lead. However, we think that you refer principally to the so-called graded leads or mixed white paints that are sold under the

name of pure white lead, and in which this article is conspicuous by its absence.

These generally consist of zinc white and heavy spar or barytes or of sulphate of lead, zinc and barytes, and they invariably become dry and hard in the bottom of tins, the oil having no affinity for the heavy spar, whose specific gravity is greater than that of either zinc or lead sulphate.

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White Fireproof Paint for Entrance to Coal Mine.

The entrance to a coal mine, 562 feet deep, was to be painted. The place was cool and damp, and there were frequent explosions from gas and coal dust. The management desired a white fireproof paint.

It would be unwise to use an oil paint or other costly preparation on a job of this sort, and we can suggest something very simple which we are told of by a painter who has used it for over thirty-five years in damp cellars and other moist places with very satisfactory results.

Three pounds of wheat flour, seconds, are mixed with cold water to the consistency of syrup and then poured slowly into five gallons boiling water, to which is then added one pound of crystallized vitriol of zinc (zinc sulphate) and when this is fully dissolved stir in, for white, twenty pounds—more or less, as needed—of zinc oxide (zinc white). If a buff color is wanted, use yellow ocher in place of zinc white; for red, use Venetian red.

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Dyeing Car Seats Without Removing Plush.

We have received a communication from a brother craftsman in Canada, who says that he has had experience in that line and found the following plan to work out satisfactorily: When the plush was not too much blackened and the nap or pile not too much worn, the seats were made as bright and clean as new. First, a thorough scouring with a good stiff brush dipped into a solution of one ounce concentrated lye to a pailful of warm water was given to remove all grease. Then a second scouring with vinegar to counteract the alkaline properties of the lye was given, which also acts as a mordant for the dye, as our grandmothers used to do in their days when dyeing cloth, namely, add a few drops of vinegar to set the dye. This is done on one day and next morning the same brush is used for applying the dye, which is placed in a shallow dish, the brush dipped into it and the plush, as it were, scoured with the dye. Our informant, who, for obvious reasons, does not wish to have his name appear in print, further says that he has spoken to the manager of a dye works, who informed him that the method would be followed if he had similar work on hand, and that any good red dye of the proper hue would do the work.

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Cleaning Cars for Revarnishing.

An opinion was asked as to the merits of a weak solution of sal soda in water for cleaning the varnished parts of cars, etc., that are to be revarnished. The solution had been used with powdered pumice for rubbing and cleaning the surface, which is painted light buff and golden ocher, and this was followed up by a thorough washing with hose, water and brush.

You fail to state what experience you have had with your method of cleaning the cars with your soda solution and pumice stone, but as you simply ask our opinion on the use of soda, we will say that we prefer the use of good soap in place of the soda solution. We consider the following method the quickest and safest for preparing a car for revarnishing. Good soft soap, water, pumice stone No. 2, a good stiff scrubbing brush of Palmetto fiber, if possible, a bunch of curled hair, a piece of soft wood to clean out corners, chamois skin and plenty of never-tiring elbow grease are the necessary materials and tools for good and quick work. When the surface has been carefully cleaned the hose may be used, but the surface should be wiped with the chamois skin and no water allowed to remain anywhere. Before revarnishing all loose paint should be removed from battens, corners, moldings, etc., and the whole surface lightly sandpapered. After dusting, a coat of hard body varnish, reduced with about one-fourth its quantity of turpentine, should be applied, and when this has dried all bare spots should be touched up with quick drying color to match and then puttied. When putty is dry, cut down with lump pumice, and follow by rubbing the puttied spots with powdered pumice, felt and water. Now the car is ready for touching up with color where needed, but it is often better to repaint the whole car before revarnishing, at least to give it a coat of color and varnish.

— 331 —

Apparent Causes for Non-Drying of Paint on Interior Work.

The woodwork of the kitchen of a house from which the tenants had removed four or five days previously, was painted with white lead in oil, tinted with burnt sienna and burnt umber, thinned with boiled oil, turps and a small portion of liquid drier. There were no indications of grease on the woodwork. On the base of window sills and the woodwork round the sink and water pipes that run along the ceiling, the paint dried hard, while four days after painting the balance the paint was as wet to the touch as when first applied. On close inspection the color appeared to have separated from the oil and collected in clots, underneath. The paint could be wiped off with a cloth, leaving spots of color that appeared quite hard.

Despite your belief that there was no grease on the woodwork in that kitchen, our experience tells us that your trouble was due to one of the following conditions: The surface may have been greasy without your taking notice of the same, or if not it may have been improperly cleaned by the former tenants—that is, soap may have been used in scouring and the soap not properly rinsed off; or your

paint may have been fatty and applied too stout. However, if the fault was due to the paint, it would not have dried hard without separation in the places mentioned, and therefore it points to a greasy surface or a surface impregnated with material of caustic properties, both of which will retard the drying of paint. In either case the paint will be apt to run, unless a large percentage of driers is employed; but in the presence of alkali or caustics the paint will separate in the way you describe it.

The painted work of a kitchen, no matter how short a time the room has been used for the purpose, should be thoroughly scrubbed with soap suds or water to which a little ammonia has been added, and then rinsed with clear water very carefully, because the condensation of the steam arising from cooking carries more or less grease with it.

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Method of Obtaining a Stain for Mahogany to Imitate Old Mahogany.

If you want good, durable work, make your stain by using good burnt sienna in oil, to which add a trifle of red lake to enrich it, or a little drop black to darken it, using turpentine for thinning and add japan or liquid drier to hasten its drying. Should you desire quicker drying, make red sanders stain, to which add enough asphaltum to obtain the required depth. To make the red sanders stain, buy a pound or so of red sanders from any wholesale druggist; fill any size bottle about one-quarter full of red sanders and fill the bottle with alcohol. This will extract the color from the sanders, and when it appears strong enough strain the liquid and throw the grounds away. To mix the red stain with asphaltum varnish the latter must be thinned down with turps until it is of the same consistency of the stain, or they will not mix. Dragon's blood will also make a beautiful stain for mahogany, but it is too expensive. We cannot inform you as to the quantities required to obtain the proper depth to match any given sample, but think that you can work this out on the lines given.

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Repainting Window Shades of Cloth.

There is only one material that will serve well for repainting window shades, and that is pure white lead where tints come into question. Zinc white is too brittle, and is very apt to crack at short notice in the rolling up. Put your curtains or shades, after they are removed from the roller and after fringes, etc., have also been removed, on a table or a couple of boards laid on trestles, and give them a thorough scouring with soft soap and water and when clean a second scouring with clear water, and while still wet fasten them to a convenient frame with tacks, so that both sides can be painted without waiting for either to dry. When the water has dried apply your paint with a wall brush as wide as you can find quickly and deftly. Do not go over it more than once or you will have "shiners" and window shades should be dead flat. Mix your tints from white lead in oil and the required colors in oil, thinning with benzine only, adding a trifle of drying japan only, and have the paint almost as thin as water. In

tinting avoid ocher as much as possible, unless very little only is required. It will scarcely pay to repaint any but the better grade of hand-made opaque shades; the others will not stand it.

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How to Silver a Mirror with Quicksilver.

First, have your glass plate or mirror perfectly clean; use tissue paper for the final cleaning. Then lay a piece of tin foil (not lead foil) somewhat larger than your mirror on a smooth, flat surface and pour mercury to the depth of one-eighth of an inch over the tin foil. Slide the clean glass plate over the foil with the advancing edge just under the surface of the mercury, so as to bring a new surface of amalgum against the glass. Then leave the glass for about fifteen minutes under pressure, and stand it on edge to drain. Collect the surplus mercury into a bottle for future use, and when the quicksilver on the glass has hardened it can be backed up with flat black, which will make it more durable.

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Removing Paint from Highly Polished Tanned Leather.

We are sorry to say that we have no experience in that line, but can readily understand that turpentine and coal oil are not powerful enough to do the work. He should have used chloroform and a stiff brush, similar to a large tooth brush, or alcohol. A mixture of absolute alcohol and sulphuric ether (equal parts) will remove any kind of paint or varnish from leather, the varnish usually employed for such work being shellac, which is soluble in alcohol, and chloroform or sulphuric ether will dissolve the hardest paint when given plenty of time. In relettering such work, quick drying flat colors must be used and the whole freshened up with shellac varnish.

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Mixing Certain Colors, Tints and Hues.

Owing to the varying strength of the different brands in commerce, we shall refrain from giving proportions, placing the name of the color of which the largest quantity is required first, and that of which the least is required last. The colors we select for the combinations are such as would be used by artists and decorators, but not for the ordinary purposes of the house painter.

AMBER.—Yellow lake with a little white or red lake and chrome yellow.

ASHES OF ROSES.—White, carmine or red lake tinged with ivory black.

BISMARCK BROWN.—Burnt umber, Dutch pink and red lake.

BURGUNDY.—Asphaltum with good red lake.

CLARET.—Any good purple lake or carmine and a trifle of ultramarine blue.

DUCKS' EGG.—White, ultramarine blue, chrome yellow.

INVISIBLE GREEN.—Lamp or drop black and very little medium chrome yellow.

TEA GREEN.—Raw umber, chrome green and ocher.

WILLOW GREEN.—Verdigris and white.

LEATHER COLOR.—Burnt sienna, burnt umber, subdued with enough white to produce effect.

LIME STONE.—White, yellow ocher and a little black and red each.

PEACH BLOSSOM.—White and king's yellow (orpiment).

PLUM.—White, ultramarine blue, red lake or carmine and a little drop black.

PORTLAND STONE.—Raw umber, yellow ocher and white enough to produce effect.

SAND STONE.—White, yellow ocher with very little black and red.

SLATE.—Lampblack, white, blue and a trifle red.

STONE COLOR.—White, yellow ocher, burnt umber.

VIOLET.—Carmine, ultramarine blue and a trifle black.

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Shellac Varnish that Has Separated on Long Standing.

A five-gallon bucket of orange shellac varnish, warranted pure gum, and found to be of good quality when bought, in the fall, was allowed to stand all winter in a place without heat. On opening the package in the spring it was found that the gum had separated and was in the form of liver. Removing the bucket to a warm room, and frequently shaking it failed to make the material come together. On heating a portion, it apparently dissolved, but separated on cooling.

We believe that the trouble is due to a loss of strength in the solvent, caused by evaporation, and it is also possible that moisture has been absorbed in some way. The material should be placed in a kettle that is set in a water bath, similar to that used for melting glue, and while thus being heated it must be well stirred; then more spirit should be added to make up for what has been lost during the heating.

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Best Size for Gilding on Glass.

The best size for gilding on glass is, without exception, fish glue dissolved in rain water. To find out whether it will be just right for burnishing the leaf is to try the size on the hand and have it so thin that it has only slight adhesive power, because if too much isinglass is used the leaf does not burnish well. A prominent sign writer uses a size made by dissolving isinglass in white wine vinegar, filtering the size before using. Some decorators in Europe prepare a size by macerating the seeds of quince in white whisky or brandy until the resulting liquid attains proper cohesion, then filter it. This is said to be the best size for gloss gilding on glass, but, of course, the most expensive one also.

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Methods Employed in Waxing Floors.

It is not necessary to apply floor wax hot, though this is done on parquet floors. Melted wax that has become thick on standing can be thinned with turpentine while cold, but it is best to use a water bath, same as for melting glue. Do not use an open fire, as it is dangerous on account of the fumes.

Work of polishing can be commenced as soon as the wax has set after application. Wax that is left over can be put away for the next job, but should be placed in a well closed package. The wax should have become hard enough so that it will not roll or rub up under the weighted brush. The proper way to proceed in waxing floors is to prepare the wax polish by cutting up beeswax into small pieces and melt it in a water bath, adding sufficient turpentine to make it liquid. To make it of the proper hardness use equal parts of yellow beeswax and Carnauba wax, and thin with turpentine to the consistency of thick cream. Apply to the floor with a varnish brush, and as soon as the mass has set fairly hard to the touch, begin polishing with the weighted brush, and if polish is unsatisfactory give a second coat and polish again.

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Paint to Resist the Fumes of Acid from Chambers at Fertilizer Works.

What material is best to use in making paint for the above purpose depends upon the color desired. Carbonate of lead and carbonate of lime must be avoided in its composition. For tints, oxide of zinc or lithopone (sulphide of zinc compound) should form the base, while the coloring matter should be mineral or earth paints or lampblack, as necessity may dictate. The vehicle should be heavy bodied linseed oil and manganese drier.

For solid colors, such as red or brown, any good Venetian or Indian red and mineral brown, containing not over 5 per cent. of carbonate of lime, ground in and thinned with pure raw linseed oil and oil drier, free from lead base, will serve the purpose well.

Where not exposed directly to the weather, as well as to the atmosphere, a true asphaltum varnish free from rosin will serve very well, especially for the protection of metal surfaces.

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Renovating a Painted Brick Front.

The method usually pursued in repainting brick fronts is to use bent steel scrapers where the paint is soft and scaly, following with stiff brooms or brushes, removing all the loose paint and allowing the balance to remain, as it will not show when the front is painted in flat color. Burning off with the torch would be the quickest and surest method in your case, but you would have to be careful to keep the flame away from the marble sills and trimmings to prevent their being scorched. There are many ways to remove paint without burning, but these preparations make such a mess on a brick front that the dry way of scraping and brooming is the best. You are the best judge as to

the proper method to pursue in this case, as you are on the ground and it will be a matter of an hour's time for you to ascertain whether you can get the harder portion of the paint removed by scraping or whether it is best to resort to burning. In using either method you will save yourself the trouble of washing down the front, which you would be compelled to do to save your new paint from being attacked if you used an alkaline paint remover.

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Coating a Water Tower of Steel with Asphaltum Paint or Varnish.

An appropriate estimate was wanted for painting a steel water tower, 40 feet in diameter and 40 feet in height, under the following specifications: "After inspection, which will be at shop, each sheet must be cleaned and dipped into a bath of hot asphaltum, or painted in the best possible manner with mineral paint of approved quality. When the complete tank has been tested and made perfectly tight, the whole shall be painted inside and outside two coats of asphalt paint, the last color to be selected by the engineer."

We cannot give you the figures desired, because we do not know at what price you will buy your material. Asphaltum paint is a rather vague term, and such a paint may be bought as low as thirty-five cents or as high as two dollars per gallon. The specifications are not clear enough on that point. We should think, however, that a high grade of paint is required for a tank of that description.

You can calculate the cost of each coat of paint by dividing the number of square feet of surface to be coated by 400, which is about the number of square feet that can be covered by a gallon of paint. For instance, the tank being 40 feet in diameter, the circumference is 125 2-3 feet, and this multiplied by 40 feet (of height) gives 5,026 $\frac{1}{2}$ square feet as the surface to be coated on one side, or 10,053 feet on both sides. Therefore, 25 gallons would be required for each coat. The bottom and roof of tank (if there is a roof) would contain 1,256 2-3 square feet each, and this doubled would give 2,513 1-3 feet for each bottom and roof, or 5,026 2-3 feet for both, requiring 12 $\frac{1}{2}$ gallons more for each coat. To do the work well, would require the labor of one man for 100 hours to apply one coat, both inside and outside, and 50 hours more to paint bottom and roof on both sides one coat. As you are tied down by specifications, it would be futile for us to speak of the merits of asphaltum paint.

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The Drying Out of Tinted Cold Water Paint.

A certain brand of cold water paint was used for exterior work according to directions on the package. After beating it to a soft batter, the painter added some medium chrome yellow to obtain the desired tint, and then thinned it with cold water to the consistency of oil paint. It worked very well that day, but next morning it had turned lighter, when he added more yellow, but before he got through with the job it had turned about two shades lighter and worked like soap and water. He mixed enough at once to do the entire job and kept it well stirred.

We are not familiar with the composition of the brand of cold water paint you mention, but would call your attention to the fact that water paints dry out a great deal lighter in shade than they appear in the wet state, and that it is necessary to test the shade by allowing it to dry, in a small way, before beginning to use it on a job. If you have taken this precaution, and it has dried out lighter in spite of that, then there is something in that paint which affects the chrome yellow. For example, lemon or medium chrome yellow should not be used with any pigment of alkaline nature nor with silicate of soda, because its tone is partly destroyed when these are present to any extent.

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Formula for Making Oil Wood Stains.

The following formulas are approximate, and judgment must be used, increasing or decreasing the quantity of oil color to obtain the desired result. The beauty of the stain depends on the richness of tone and the fineness of grinding of the oil colors employed.

Cherry Stain.—To two pounds burnt sienna and one pound raw sienna, add one-half gallon boiled linseed oil, one quart best brown japan and one-half gallon spirits of turpentine. If the burnt sienna is more of a brown than of the fiery red tone, then omit the raw sienna, but use three pounds burnt sienna in place of two.

Mahogany Stain.—To two pounds burnt sienna, one pound of rose pink and one-quarter pound of drop black, add one-half gallon boiled oil, one quart best brown japan and one-half gallon of turpentine. Vary the proportion of drop black according to the depth desired for this stain.

Light Oak Stain.—To two pounds of raw sienna and one-half pound of raw umber, add one-half gallon of boiled oil, one quart of best brown japan and one-half gallon turpentine. If the raw sienna is inferior in staining power, omit the raw umber and use three pounds of raw sienna.

Dark Oak Stain.—One pound raw sienna and one and one-half pounds raw umber, with thinners as for light oak stain. If too dark, increase quantity of raw sienna; if too light, add an ounce or two of burnt umber.

Rosewood Stain.—To one pound rose pink add one pint good asphaltum varnish, one pint best brown japan, one pint boiled oil, and one quart turpentine. If too dark, add more rose pink; if too light, use more asphaltum varnish and more turpentine.

Walnut Stain.—To two pounds of burnt umber add one-half gallon boiled oil, one quart of best brown japan and one-half gallon turpentine. Should the umber be very dark, add one-half pound of burnt sienna, but if black walnut stain is desired, add Vandyke brown in same proportion.

In preparing stains, break up the oil color first with the japan, adding little by little, then add the oil and finally the turpentine and strain. Test on new wood, and if too strong, add more thinners, using the proportions given in each case.

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Paste Wood Fillers.

Paste fillers for hard woods are made from any of the following materials, or a combination of these: Sillex or silica, terra alba, whiting, china clay, starch, rye flour and sometimes barytes. Sillex or terra alba will, on drying, give the least discoloration to the wood. The pigment should be of impalpable fineness and intimately mixed to a stiff paste with one-third each of pale linseed oil, pale gold size japan and turpentine. This paste may be either run through a mill or be given a very thorough mixing, and to test it for quality it should be thinned with turpentine to the consistency of a varnish, applied with a varnish brush to open grained wood, preferably oak, allowed to set for about 20 to 30 minutes, and the surplus filler removed by wiping across the grain in the usual manner. After 24 to 36 hours, the surface should be lightly sandpapered and a good, flowing coat of rubbing varnish applied, which, when fairly well set, should not show any pitting or pinholes. Should it pit, however, or show pinholes or needlepoints, the filler is defective in binding properties and the portion of japan should be increased with a corresponding decrease in the proportion of turpentine. The linseed oil and the gold size japan must be of good body, and if cornstarch or rye flour is used in connection with sillex or silica, the proportions should be about one of the former to five of the latter by weight.

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Glazing Putty or Knifing-in Lead for Car and Carriage Work.

To prepare this properly, you must be sure to use keg lead, that is, pure white lead in oil, and none of the so-called white leads. A corroder's brand on the head of the package will give you the assurance of purity. To prepare 100 pounds of the material, mix in a suitable tub with a stout paddle (unless you have a powder mixer) 65 pounds keg lead, 25 pounds dry white lead, one-half gallon pale coach japan, one-half gallon pale rubbing varnish and one quart spirits of turpentine, and run through a paint mill until fine. This will be of the consistency of soft putty and should be applied with a stiff brush to the parts of the car or carriage, and when it has deadened or flattened, is to be gone over with the putty knife, with which it is pressed into the pores of the wood, and the surplus removed. In other words, it is used as a putty to fill up, and care should be taken not to have any ridges of surplus glazing putty anywhere on the work, being especially careful of the moldings around panels or where irons and wood are joined, because the jar of the vehicle, when in service, is liable to shake the putty loose. For cheaper grade of work, finely bolted whiting may be employed to replace the dry white lead, but the amount of japan rubbing varnish and turps will have to be doubled.

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Dustless Floor Polish or Floor Oil.

We do not think that these dustless floor oils are used as much now as they were several years ago, because of the ruin wrought on ladies' dresses in stores and public places, where the material was used on floors. We understand that it is a good dust layer in store-rooms, warehouses, etc., but that it collects dirt so much that it finally leaves a bad crust on floors. The following is considered a good formula: Equal parts, by measure, of neatsfoot oil, cottonseed oil and petroleum oil. For the latter, golden machine oil is generally used, and part of the cottonseed oil may be displaced by lard oil. A coat of the mixture is applied to the floor with a mop, and will last from four to five months.

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Japanning Tin or Iron.

While we believe that it would be more economical for you to buy your japanned tin ready prepared from some reliable firm of japanners, whose name or place of business you may ascertain by consulting the business directory of any large city, we shall give you a formula for making japan flow, so-called, with directions how to produce the various colors.

The transparent flow or liquid is prepared as follows: Put into a suitable kettle one pound of gum sandrac, two ounces each balsam of fir, balsam of tolu and powdered sugar of lead and one pint of well settled raw linseed oil. Set the kettle over a slow fire, which is gradually raised until all are melted, stirring in the meanwhile to keep the material from becoming burned in bottom of kettle, then take to a safe distance from fire and allow to cool down somewhat, stir in gradually one-half gallon spirits of turpentine and strain through fine cloth. For black, melt good asphaltum, say four ounces and thin with one pint of turpentine and rub down fine in part of this one ounce of Prussian or Chinese blue. Mix all and strain, then add to it one quart of the flow.

For blue grind one ounce each of Prussian blue and indigo in turpentine, add enough of the latter until you have used one quart. Strain well and add enough of this to one quart of the flow until the color suits your idea.

For red steep one ounce of cochineal in a quart of turpentine, let stand twenty-four hours, stir and strain. Add enough of this to the flow until you have the color desired.

For yellow take two ounces of finely pulverized curcuma root and stir it into a quart of the flow. If color is not strong enough, use more of the curcuma, let it stand several hours, then strain.

For green mix equal parts of the blue and yellow, and with this enough of the flow to make color suit.

For orange mix some of the red with the yellow until color is as desired, then add some of the flow as above.

These colored japans are applied with wide, soft brush to tin and then the tin is baked in a suitable oven, but while the black can stand a high degree of heat, say 300 deg. F. or more, the other colors should

not be subjected to more than 180 deg. F. The tin or iron, of course, must be clean, free from grease and rust, or the japan flow will not take well.

Japanning is an art in itself, and to do good work requires skill and experience, therefore we should advise you, unless you can afford to spend money and time on experiments, to procure your tin from japanners or have them to do the work for you.

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Cleaning and Preservation of Oak Parquet Floors.

The cleaning and keeping in condition of oak parquet floors in our dwellings is known to require much trouble and work. The purpose of the cleaning is to keep them as long as possible in that condition in which they were when new. This end is more or less completely attained by the various modes of cleaning. The process still almost universally pursued is mechanical in its action, the cleaning being accomplished by rubbing the dry floor with steel chips. This method, says the "Centralblatt," is a laborious and slow one, hence it seems of advantage to make known more generally a hitherto little employed process, which has quickly crowded out the old method of cleaning wherever used. No dust is generated in this new process. It is founded on the removal of the dirt by oil of turpentine, and is performed as follows: Dip a perfectly dry wainscot brush in a vessel filled with oil of turpentine and brush a small surface, about half a square yard, of the floor diligently and repeatedly with it. This treatment is succeeded by an immediate washing off of that surface with hot water, whereupon the cleaned place is wiped off and rubbed dry with a dry rag or, better still, with oakum. When the floor treated in this manner is perfectly dry, after a few hours, it appears as though freshly rubbed down. Now wax, as usual, and brush until glossy. The solution of one part of white wax in two parts of oil of turpentine has been found excellent for this purpose. The parquet floors cleaned according to the above method keep like new for a long time, provided that for the frequent rubbing necessary only clean brushes and rags are employed. The cost of the oil of turpentine may seem high, but since the new method requires much less time than the rubbing down with steel chips, the extra cost of the material will be offset by the saving in wages.

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Finishing Floors with Wax That Have Been Partly Oiled.

We should remove the floor oil from the floors with benzine, that is, if there is any on the surface; and melt the paraffine wax in a water bath, thinning it with turpentine, apply to the floor and polish with a floor brush. You cannot separate mineral or other oils of that stamp from linseed oil, but foots in linseed oil can be removed by allowing the oil to settle for some time and decanting the clear article.

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How to Remove Ink Stains from Light Tiling.

The simplest way we know of is to dissolve oxalic acid in water and rub this solution over the stains by means of a piece of sponge fastened to the end of a stick, and as soon as the stains have disappeared, give the tiles copious washing with clear water. When the stains are not too old, citric acid dissolved in water, or chloride of lime mixed with water to a soft batter will answer the same purpose, but the tiles must be well washed or rinsed with clear water as soon as the stains have disappeared.

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The Best Finish for a Hard Pine Counter Top.

Liquid wood fillers are used on account of cheapness in place of shellac varnish for filling soft woods like white pine, etc., but will not produce good results on hard pine counter tops. Hard oil finish, well made of good material, is a very good varnish for hard pine on ceilings, wainscoting, etc., but is not the best material for counter tops. If a first-class job is desired on hard pine, we would say that a coat of orange shellac should be applied next to the bare wood, to be followed by a first-class coach rubbing varnish and finished with either one coat of this or a good, elastic coach varnish which could be rubbed and polished in the usual manner, if so desired, or rubbed down to eggshell gloss.

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Coating Very Old, Hard, Smooth-Plastered Walls.

To fill in cracks in old walls, cut out all the cracks V-shape, clean out the holes and bevel the edges same as the cracks. Make a filling of fine plaster of paris mixed with thin glue size, fill the cracks carefully and when dry, sandpaper the filling smooth and level with the wall. Go over all of the wall with sandpaper and knock off any small lumps that may be there. Wherever you find any loose plaster, sandpaper down such patches a little below the level of the wall and brush off the loose plaster; give a coat of glue size and trowel on a coat of plaster of paris, mixed with glue size, and when dry, sandpaper smooth and level. Wherever cracks or loose plaster patches have been filled in, there is usually more suction than there is in the unbroken portions of the wall; therefore, in order to have no flat patches, when the painting is finished, it is necessary to stop such suction before the first coat is applied by going over such places with a coat of oil and drier, and when this is dry, with a coat of white lead, thinned with equal parts japan varnish and turpentine. This is rather troublesome, but it will pay in the end. To prime the wall, use white lead, say not over 8 pounds to one gallon raw linseed oil, and add one pint of turpentine to make it more penetrating, and if your work is to be hurried, a small portion of liquid drier. In order to make a good job of three coats of paint on a wall, where most of the surface will lose gloss on the first coat and where there is suction in spots on the third coat, you will have to apply a coat of glue size

on top of the priming coat. You can make this size by melting white glue water, but in order to keep it from souring in hot weather, you should add on cooling, for every pound of glue used, two ounces of acetic acid, which you can buy of any druggist. The second coat of paint should be mixed, so as to dry with fair gloss, with three parts of oil to one part turpentine and drier. The last coat to be stippled should be mixed stout with equal parts oil and turpentine and some drier. To do the stippling properly, the stippler should immediately follow the painters, before the paint has any chance to set, and care must be taken to strike the paint evenly and steadily. As to the method of sizing plastered ceilings with liquid wood filler before kalsomining, we see no objection to it, as many use a so-called suction or ceiling varnish for the purpose, which are no better or perhaps not as good. Many painters, however, use a wall size made from white glue, alum and white soap.

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The Apparent Perishing of Chinese and Prussian Blue in a White Lead and Zinc Paint.

A light blue tint was mixed with lead, zinc and Chinese blue and placed in a tightly-corked bottle. Three lots were mixed, using the same quantity of blue, but varying proportions of lead and zinc. On opening the same, three years later, the color was a cream tint, varying in shade in each bottle. Each of these tints was painted on a strip of glass and exposed to the sun at noon. By the next morning the original color had come back.

It cannot be said that in the case of your tints there was any alkaline reaction on the Chinese blue, so long as you used pure white lead and pure zinc, but you may have made use of a drier containing lime. Lime in any form, even whiting, has the effect stated on Chinese or Prussian blues, and we experienced similar difficulties with Chinese blue tints some years ago, but have not noticed any similar occurrence of late, and we attribute the trouble to the use of a drier containing lead and manganese salts, with lime as a hardener. Only recently has it dawned upon us that the use for several years of a strictly oil drier, free from lime, has remedied the defect. As in your case, Chinese blue tints on standing sealed up several months appeared on opening to be white, but on exposure to air assumed very nearly their original light blue color on top, while on being painted out the apparent white or light cream color soon turned blue. It is a noted fact that Chinese or Prussian blues cannot be employed safely with whiting in kalsomining on account of the decomposition brought about by no matter how small a portion of free lime there may be. Any alkali, such as soda, potash, ammonia or lime, will decompose it into a ferrocyanide of the alkali and oxide of iron, and therefore these blues or any pigments containing the same cannot be used with alkaline bases or vehicles, such as lime, whiting or the silicates of soda and potash. In your case the Chinese blue was not decomposed, but it was temporarily obscured or hidden and brought to light again by the exposure to air and light.

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Chalking of White Lead and Oil Paint in One Year.

A house was painted with pure white lead and linseed oil, slightly tinted. Six years later it was repainted with two coats of a standard brand of white lead and a crusher's brand of raw oil, tinted green for the body and trimmed in plain white. The surface before repainting was apparently in good condition, but in less than a year the new paint had chalked badly, rubbing off the surface like so much flour.

Did it occur to you before you started repainting last summer to examine the surface critically to see how much oil you should have in your first coat, because of the dried-out old paint that had stood so well for six years? Perhaps all the oil you gave in your first coat was required by the old paint and absorbed by that, and the first coat, being robbed of its oil, in turn absorbed some of the oil that was needed to give the finishing coat a good hold. You do not state the kind and proportion of japan or drier used along with the oil, and this is an important factor. Also last summer and fall was exceedingly dry and hot enough to burn up any paint that carried an excess of drier and an insufficient quantity of oil. Before you lay the blame on the lead or the oil, step around to the north side of the premises and investigate how the paint stood there. If it has not chalked on that side or on the shaded portions of the house, you can figure the cause of the perishing out on the above lines, otherwise the lead or the oil was not as it should have been.

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A Good Size for Plastered Walls.

Make two solutions, the first to consist of one and one-quarter pounds of glue, dissolved in four gallons of water; the second to consist of one ounce of borax, five ounces of washing soda and twenty ounces of powdered rosin added to five quarts of boiling water, and to be kept boiling and stirred until all is dissolved. To thirty parts by measure of the first solution add one part of the second and boil them together for about one-quarter of an hour; take from the fire and strain; when it is ready for use. You will find this size an excellent one for the purpose.

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Wiped Verdigris Finish in Imitation of Patina.

Use a ground made from about 25 pounds of pure white lead in oil, 3 pounds medium chrome yellow, 5 pounds Venetian red with enough burnt umber to make a color resembling dirty copper. Apply as many coats as are required to give a good surface, making the last coat so as to dry semi-flat. When dry and hard, apply copper bronze, dry or wet, as you choose, using a good outside varnish, thinned with turps, as a medium to hold it. If you do your bronzing dry, remove the excess of bronze with a wad of cotton; if wet, you can go right over it on becoming hard with either of the following: Make a glaze from French distilled verdigris that has been ground fine in

varnish and is thinned with turpentine; so as to produce an egg-shell gloss on drying, or make a stain from raw umber that has been ground in japan, thinning with equal parts of coach or outside varnish and turpentine. Before the glaze or stain has an opportunity to set hard, take a cloth and wipe out the high lights, thus producing the effect of antique copper bronze. If there is sufficient ornamentation, the effect is a very pretty one, especially when verdigris is used. Many public building fronts are being done in this manner.

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Linseed Oil for Outside Painting.

Kettle-boiled linseed oil of good, heavy body will hold its gloss in paint very much longer than raw linseed oil, and well-settled raw linseed oil, that has become bodied by age, is better, by far, than green oil. The durability of linseed oil depends largely upon its being well settled by age, without being rancid. Our experience has been that well-settled raw linseed oil is better than boiled oil at any time, providing very little of a good oil drier only is added.

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How to Fill and Finish Redwood.

See that the surface is well planed and smoothly sandpapered; add some burnt sienna to a good paste wood filler; thin the same with turpentine to the consistency of varnish, and apply it in the usual manner; wipe off the surface in from 15 to 20 minutes and let it stand at least 36 hours; then sandpaper lightly and dust off carefully. To do a first-class job two coats of good shellac varnish should be applied, sandpapering each coat with fine sandpaper. Now, it depends on the price paid for the work as to how many coats of rubbing varnish it should have. Less than two coats will not answer; four coats will give a better surface for polishing. Let each coat become thoroughly hard before applying the next, and when you have as many coats on as you can afford, rub the surface with pumice and water and wash off thoroughly; let it stand 24 hours; then rub with rotten stone and water; wash and clean off as before, and give it another 24 hours' rest; then polish with rotten stone and olive oil, and if you have used a good varnish you will have as good a job as can be done.

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How China Glossing Should Be Done.

The interior of a fine dwelling in a Southern city was finished with French zinc white and damar varnish. Twenty years later the surface appeared yellow with age, though showing no pronounced checks, except in places where the light was strong. The owner thought two coats of zinc white in damar varnish would be sufficient, and the painter asked for advice.

We should strongly advise you against making a contract for the work on the owner's proposition before you have thoroughly

investigated the condition of the surface. You will find, on close investigation, fine cracks, not only where the light is strong, but most likely all over the surface of the old paint. To repaint this without preparing it would not add to your reputation as a painter, because the checks would simply show through your paint. To do the job in a proper manner will require a thorough washing down of the surface and a cutting down of the same in order to get, if possible, under the checks to the white lead groundwork, which, no doubt, is there solid and without cracks. If you succeed in doing this you should then give one coat of white lead, thinned half oil and half turps, with as little pale drier as possible, and when this coat has thoroughly hardened one coat of French zinc white, thinned with turpentine only, so as to dry flat. This coat should be sandpapered and dusted, then one coat of China gloss white given as a finish. If the owner wants a first-class job and is willing to pay for it, the coat of China gloss, after standing four or five days,, can be mossed or haired down with flour of pumice and water, and a second coat given. If you do not care to use prepared China gloss white, you can make your own preparation by thoroughly mixing two pounds French zinc white in damar varnish with one gallon clear damar varnish, but we believe it will pay you best to purchase the material prepared ready for use.

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Various Ways of Painting Plastered Walls.

If you wish to paint whitewashed walls or ceilings in oil or water and make a durable job, soften the whitewash with a wash made of one pound potash, dissolved in ten quarts of soft water, applying it repeatedly over the surface with a large sponge, then scrape off. However, if the whitewash adheres well, you can save yourself the expense of removing it, and bind it with a glue size, over which you may put your kalsomine without risk of its coming off and taking the old whitewash with it.

The glue size must be made from good white sheet glue, one pound, one pound good white bar soap, two ounces of alum. First soak the glue over night in enough water to make a jelly, then melt it in a water bath, adding from one to two quarts boiling water. Dissolve the alum and soap each separately in a quart of boiling water, and when all are thoroughly dissolved, mix the glue and soap water; then add the alum solution slowly, stirring during the operation. Finally add one gallon cold water. In order to make it penetrate, it must be applied warm, or it will not hold the whitewash securely on the wall. This is for kalsomining or water color painting only; for oil painting the whitewash must be removed by all means. In the latter case, apply a thin coat of white lead priming, say about ten pounds of keg lead to seven pints raw oil, and one pint turpentine and drier. When this coat has become hard, give one coat of glue size, which will save you two coats of paint.

This glue should be made in the usual way from good white glue to a fair consistency, and when nearly cold, one-half ounce nitric acid should be added for every pound of glue used, which will keep it

liquid and prevent it from spoiling. In place of nitric acid, double the quantity of acetic acid may be employed.

When the glue size has dried hard, as many coats as are necessary to cover up uniformly are applied, using white lead in oil thinned with raw oil and turpentine, finishing in either white lead or zinc, tinted to suit, flat or in gloss. This applies to newly plastered walls, as well as to whitewashed walls, and while kitchens, halls, etc., should be in gloss, we think the walls and ceilings of churches, school houses and other public halls look far better when painted flat with a faint eggshell gloss finish. When old painted walls that are very dirty are to be renovated, dust them carefully, then scrub the same with soap and water, to which a little ammonia has been added; then follow with sponge and clear water, wiping up with dry sponge or cloth. In repainting, cracks must be filled in and touched up as described in No. 353.

If you desire to kalsomine whitewashed or newly plastered walls, prepare the kalsomine or water color as follows: Soak over night one pound of good white sheet glue in cold water. If there is too much water, pour it off, then dissolve the glue in the usual water bath. This will be sufficient for twenty pounds of best gilders' whiting, which should be mixed with water to a stiff batter, to which is added one pound of alum, dissolved in hot water. Before the glue is added, the tinting colors should be added to the whiting, and such colors should be ground in water, as dry colors will streak. Test the mixture on a piece of white paper until you have the desired tint or shade.

When you have the proper tint, add the glue and test to see whether you have enough binder, and if not add more glue, then set aside to cool. Remember that you must have enough binder so that the first coat will not rub up when applying the second.

For a clear white job, add a little ultramarine blue; for a blue tint, use more ultramarine. Do not use Prussian or Chinese blue, as it is apt to green off. For a light green tint, use chrome yellow and ultramarine blue, and for terra cotta tint, use light Venetian red.

As to our opinion on the respective merits of oil colors vs. water color painting of walls, would say that it is a question of first cost, kalsomining being much the cheaper of the two methods, while oil color is the more durable. When oil color becomes stained from leaky roofs, smoke, etc., the surface can be cleaned down and look as good as new, while stains in kalsomined walls cannot easily be removed.

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Should Gold Leaf Be Varnished?

Genuine gold leaf will not tarnish from exposure to weather, even salt air, and is better left unprotected by varnish for two good reasons. First, any varnish, no matter how pale and transparent, will dim the luster of gold; and, second, varnish is sure to crack in a year or two, giving the gold an appearance of perishing, while when the gold leaf is left free from varnish, it will remain bright and lustrous for years.

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Painting and Finishing Enameled Furniture.

The priming is done with keg lead, which is thinned with turpentine and very little bleached oil and white japan. On this are applied two coats of quick-drying flake white, thinned with turps only, the last coat of which is smoothly sandpapered. Now a coat of white enamel is given, this enamel to consist of the finest French zinc in a hard white enamel varnish and allowed to set for three days, when it is rubbed with pumice and water. After twenty-four hours another coat of enamel is applied, which after forty-eight to seventy-two hours is mossed or haired down with flour of pumice and water. If the surface is good and uniform, this is polished with rotten stone and sweet oil; if not, another coat of enamel must be given and proceeded with as before, and finally polished as stated. This will be smooth as a mirror and hard as bone. In surfacing, each coat of lead or flake white must be permitted to dry hard before another is applied.

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Priming with Yellow Ocher.

We do not consider yellow ocher the best material for priming new woodwork, because even the best and finest French yellow ocher is at best a brittle pigment. When the priming may stand several weeks or months before second coating, we consider a mixture of equal parts of white lead and finely ground yellow ocher, thinned with pure raw linseed oil only, an excellent priming, when applied thin and well brushed in, especially for soft woods, but for yellow pine and other hard woods we consider a thin wash of pure white lead and raw linseed oil with a little turpentine the only good priming material, especially when the work must be hurried along. Coarse ochers are entirely unfit for priming.

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To Remove the Old Paint and Varnish from Hobby Horses.

We have had no special experience in that work, but think that you had best try the torch, if you wish to make any headway. A lye or soda solution would, no doubt, prove most effective and would scarcely affect the glued joints very seriously, but it would raise the grain of the wood in such a manner that you would be unable to produce good work in repainting. American fusel oil, free from water, is a first-class remover of varnish, but the work is tedious when there are heavy coatings to be removed, and the fumes are rather injurious to the system of the operator. A mixture of two parts by volume of aqua ammonia and one volume of spirits of turpentine produces an emulsion that softens paint and varnish and does not raise the grain of the wood, but its action on old coatings is very slow and tedious. Try the various methods described here on one or more of the animals, and you will probably find that the burning off of the paint with a gasoline torch that is dexterously handled will prove the most rapid as well as the most economical and cleanest method of all. If you work quickly, you need have no fear of softening the glue in the joints.

Have the necessary sticks and scrapers ready that you need to remove the softened paint from the carved portions before you make a start.

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How to Prepare a Filler for Iron Surfaces.

To make an extra good iron filler successfully, has cost manufacturers years of experimenting and large expenditure of money. So you may readily see that they do not publish their formulas broadcast and they are difficult to obtain. Even when such formulas are known, there is something in their manipulation that requires a little experience and practice. These fillers, being sold at a comparatively low figure, must be made on a large scale, in order to render a fair profit. There are many good iron fillers on the market, and we would advise you to purchase your filler ready made. However, if you wish to make a good iron filler, regardless of cost, mix three parts by weight of stiff keg lead, with six parts of Pennsylvania black filler, three parts bolted whiting, six parts floated silica or silex, with a mixture of three parts by weight of a fair grade of rubbing varnish, two parts of coach japan and one part spirits of turpentine to a stiff paste, which run loosely through a paint mill to mix thoroughly, or, still better, grind in a putty chaser. This may be used as a putty or surfacer, applied with spatula broad-knife, or it may be thinned with turpentine and applied with a brush. If not dark enough to suit, add some well calcined lampblack or bone black, dry. May be smoothly sandpapered within reasonable time, and will not clog the paper.

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Japanning in Black of Pressed Steel Articles, Applying the Dipping Process.

The main requisite is a drying oven, in which the temperature can be raised to and held at from 300 deg. to 350 deg. Fahrenheit. The size of this oven must be commensurate to the number and size of the articles to be placed therein at one and the same time. For instance, if it is desired to bake 1,000 pieces of sheet iron or steel plates of about 6 by 8 inches at one baking, an oven 8 feet in length, 5 feet wide and 4 feet in height, with the proper arrangement of iron racks should fill the bill. Ten rods running lengthwise through the oven, one set near the top and another set one foot below this would be sufficient to hold that number and keep them three-fourths of an inch apart. The oven to be built of either sheet iron or brick, with several vent holes on top and either steam or hot-air pipe coils in bottom to be fed with live steam or hot air.

The next requisite is a dipping vat of suitable size and a run or toboggan arrangement, which has balusters on either side, and whose bottom inclines toward the dipping vat, so as to return the dippings to the vat. On either side outside of the balusters is a pathway for the men, who are doing the dipping to walk up and deposit the dipped plates, or rather the long stick on which the plates are suspended on the balusters. A stick 3 feet long should carry at least 24 of the plates,

suspended to the stick by suitable hooks or clasps, and when the plates have dripped or drained sufficiently and the paint or japan has set, they should be placed in the drying or baking oven at once, and when the oven is filled the heat should be turned on immediately and kept on for three or four hours, even six hours would do no harm.

As to the black baking japan for dipping, unless the firm desiring to use such material are equipped to manufacture the material, they had better ask for samples and prices from reputable varnish makers, stating that they want a thoroughly elastic and durable baking japan in black, and select the best of those offered. One that will readily chip or abrade at the least knock the metal receives after baking is not worthy of consideration.

Japanners often give as many as three, four, five and even six coats to their work, baking every single coat before applying the next one. For the work in hand, two coats are certainly sufficient, a ground and a finishing coat. It may be that one coat will be ample, but that is a matter to be decided on trial. An essential point is that the metal be entirely clean and free from rust and grease before dipping.

In preparing black (or any other) baking japans, rosin and benzine or gasoline must be avoided if the work is to look well and be durable. For a first coat or ground, the best material is made by melting say 25 pounds Cuban asphaltum, adding 25 pounds hot balsam of copaiva, stirring well together, taking from the fire to a safe distance and thinning down with spirits of turpentine, previously warmed, to proper consistency for dipping.

For finishing coat, or when one coat is ample, the very best japan is made by melting, say, 30 pounds gilsonite and 30 pounds Cuban asphaltum, thinning with 80 gallons of hot linseed oil that has been boiled previously with 12 pounds litharge and 4 pounds manganese oxide, and when nearly cool thinned with turpentine to proper consistency for dipping.

If of too brown a tone, lampblack or drop black ground in turpentine may be added to give a more jet black luster.

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The Drying of French Yellow on Floors.

French yellow is simply yellow or French ochre under another name, and will remain "sticky" or "cleave off" when put on a greasy surface that has been cleaned with soap or lye and has not been rinsed thoroughly. Ocher in oil is not a good thing to paint floors with, unless it be an unpainted floor in very porous condition or on very spongy wood. To apply it over old paint or hard wood, like yellow pine, by itself is a mistake; it should be mixed with its own bulk of white lead, and the mixture should be thinned with a good hard drying japan and turpentine, so as to dry with a good eggshell gloss only. For interior floors it should be mixed with at least its own weight of zinc white, and thinned as noted above. The principal feature, however, is to make the paint as thin as possible and brush it out to the utmost. It will, when so mixed, cover well enough at any rate. A first-class floor paint, though somewhat expensive, but one that

wears well. may be made by mixing fine French ocher with wood alcohol shellac varnish, Venice turpentine and fusel oil. Two pounds ocher, seven pints wood alcohol, one-fourth pint Venice turpentine and three-fourths pint fusel oil is the proper proportions.

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Causes for the Creeping of Paint and Their Remedy.

Creeping or crawling of paint amounts to the same thing, and is caused either by a greasy surface or by too high a gloss of the under coats. When an old surface is to be repainted, as in kitchens, etc., the walls and woodwork must be cleaned thoroughly with soap-suds or ammonia and water, well rinsed and allowed to dry thoroughly before beginning to paint. On the exterior of buildings, it is principally in the sheltered places that paint creeps or crawls, because there the gloss of the old paint usually remains, because the elements have had no opportunity to attack the paint and destroy the gloss. It is well to add some turpentine to oil paint for use in these places. A trifle of a weak solution of potash added to the paint will prevent its crawling.

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Simple Method for Staining Cypress and Southern Yellow Pine in Imitation of Golden, Antique and Red Oak.

As cypress wood is apt to quirl up after having been smooth planed and sandpapered, water stain is not a good material to apply, and therefore we would suggest the use of oil and pigment stain, which will also answer best for the yellow pine, as it is very pitchy, and water stains would not penetrate well into it. For golden oak stain use burnt umber in oil and asphaltum, say one pound of the former and one pint of the latter, add one-half pint of best brown japan, and when well beaten together thin with turpentine to the consistency of a very thin varnish and apply.

When the stain has set, wipe with a cloth to bring out the high lights. Try it on a strip of the lumber first, and if the effect is not golden enough add some medium chrome yellow. But you must bear in mind that golden oak is really white or red oak stained, and that you cannot obtain an effect quite similar on the woods you mention.

For the antique oak stain use a good raw umber in oil, say one pound, and two pounds of Vandyke brown in oil, to which you may add, if required, one-half pound of drop black in oil and one pint of best brown japan. After beating these well together, thin with turpentine in the same manner as the golden oak stain and apply, proceeding as above.

To imitate red oak, make a stain from strong Venetian red and add a trifle of drop black to subdue the glaring redness.

It is self-evident that the colors must be of the utmost degree of fineness and strength, as yellow pine is rather difficult to stain.

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Chipped Glass or Embossed Glass Gilding.

The object of this method of gilding on glass is to have the gold leaf appear dead flat in some parts of ornaments or parts of letters, while the other parts are burnished, which gives very pretty effects. The chipping or embossing is accomplished by either the sand blast or by the hydrofluoric acid treatment, the former method being the most rapid, economical and surest one.

To etch or chip glass with hydrofluoric acid, which should be kept in lead vessels or gutta percha bottles, the glass must be laid down flat and the design or letters must be cut in with a varnish made of equal parts of asphaltum and paraffine wax, that are melted together and somewhat thinned with turpentine. Two or three coats of this may be necessary in order to cover well, and then a border of soft bees-wax is run around the edge of glass to keep the acid from running over and from running under the edges of the protective varnish. Now the hydrofluoric acid is poured on so that the parts to be eaten are well covered. Let it remain until the etching is deep enough, then pour off the acid and rinse well with clear water, remove the wax border and the protective varnish, and when dry go on with the gilding, using the usual isinglass size for laying the leaf. Sometimes, however, there may be ragged edges by following this method, because the protective varnish cannot always be depended upon, as the acid will at times find its way under the edges, and therefore the sand blast machine does cleaner work, because here a paper stencil can be employed that is pasted all over the surface of the glass, allowing the blast to act only on the cut-over portions.

The sand used on glass should be hard and sharp, and, above all, free from dust. No coarser sand than that which will go through a sieve having forty wires to the lineal inch should be used, and sand passed through sixty-mesh sieves will be none too fine in many cases.

As stated before, the sand blast process produces cleaner work and with much greater rapidity, but, of course, it does not pay to purchase a machine unless there is plenty of such work to be done. The man who has only a job in that line occasionally will have recourse to the hydrofluoric acid treatment, while those who make a specialty of this class of work employ the up-to-date improved sand blast machines that are worked by steam power.

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To Keep a Solution of Glue in Liquid Form.

Dissolve your glue as usual, and place it in a glass jar or earthen dish, and while still warm add to the solution one ounce of strong nitric acid for every pound of glue used in making the solution. Stir the acid in slowly and stop stirring when effervescence has ceased, allow to cool, and keep in a tightly closed vessel. To be in the right condition it must emit a smell as sour as ordinary household vinegar. For fine work, prepare your liquid glue by filling a wide-mouthed bottle a little more than half full with good white sheet glue and filling

the bottle with white whisky or equal parts grain alcohol and rain water. Keep well corked.

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Deep Rosewood Stain for Hardwood.

By referring to No. 344 you will find a paragraph headed, "Formula for Making Oil Wood Stains," in which, among others, you will find the formula desired.

You may vary this by using a good, genuine ivory drop black, ground fine in oil in place of the asphaltum, and make up the stain by using two pounds rose pink in oil and from one half pound to one pound of ivory drop black in oil, one pint boiled oil, one pint best brown japan and about one quart of turpentine. It will depend on the skill of the workman to obtain the right effect in wiping off the surplus stain on setting.

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Restoring Blackened Spots in Yellow Pine.

After you have removed the varnish with ammonia, a good saturated solution of oxalic acid applied repeatedly and rinsed with clear water thoroughly should restore the wood to a lighter color, but the black spots should be treated with an application of a solution of tin in dilute muriatic acid. Dissolve a piece of tin the size of a nickel in one-half pint of commercial muriatic acid and dilute with a similar quantity of water. Apply with a sponge tied to the end of a stick, repeatedly, then rinse with clear water and allow to dry; then sandpaper. If this does not lighten up the spots, then there is no remedy, because the trouble is too deepseated.

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Painting of an Iron Stack With Lampblack and Oil Against Asphaltum.

An iron stack was painted with two coats of asphaltum, which perished in less than eight months.

The asphaltum black was probably one of those cheap nostrums composed of part asphaltum and part coal tar or rosin. A true asphaltum varnish with a good portion of oil would no doubt have stood longer. One coat of a lampblack and kettle boiled linseed oil will last much longer than two coats of cheap asphaltum, but both lampblack and oil must be first class and the surface must be thoroughly scraped and wirebrushed to remove every trace of asphaltum and rust. We should advise giving the stack two coats of lampblack and oil.

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Quantity of Linseed Oil Required to Grind Various Pigments Into Paste.

In the following we give the average quantity in pounds of oil required, when the materials named are bone dry and in finely powdered state:

Materials.	Lbs.	Material.	Lbs.
White lead	9	Chinese blue	105
Zinc white	20	Ultramarine blue	40
China clay	35	Imit. Cobalt blue	45
Terra alba	26	Genuine cobalt blue	85
Whiting, bolted	23	Chrome yellow, light	25
Blanc fixe	15	Chrome yellow, medium	30
Barytes	8	Chrome yellow, dark	26
Silica	32	French carmine, No. 40.....	75
Lithopone	13	Verdigris	50
Yellow ocher	34	Bone black	100
American ocher	30	Lampblack	250
Burnt ocher	32	Gas black	420
Raw Ital. sienna	110	Mineral black	90
Burnt Ital. sienna	90	Drop black	125
Red oxide	28	Vegetable black	150
Venetian red	26	Mineral brown	28
Indian red	22	Terra verte	80
Tuscan red	28	Viridian	90
Raw Turkey umber	100	C. P. chrome Green, L.....	30
Burnt Turkey umber	85	C. P. chrome green, D.....	35
Vandyke brown	115	Comm'l chrome green, L.....	18
Bitumen	125	Comm'l chrome green, D.....	20
Brown madder	100	English vermilion	16
Red madder	120	American vermilion	18
Prussian blue	100	Emerald green	37

With the exception of the chrome greens with the prefix Comm'l, the colors named are chemically pure, and the quantities of oil indicated are such as are actually required in practice and not copied from text-books.

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Painters' Cream.

Painters' cream is a sort of emulsion used by artists to cover their paintings with temporarily during transportation or when buildings containing costly or treasured works of art are renovated, and is made as follows: Gum mastic, 2 ounces. dissolved in 14 ounces pale nut oil by heat; add to this one-half ounce by weight of white sugar of lead, previously ground fine in linseed oil; then add water slowly and gradually until an emulsion of the consistency of cream is formed. This cream can be removed readily with sponge and water.

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The Preparation of Crayons for Drawing Upon Paper.

Crayons are usually made up of color and some substance that will dilute the color to the desired shade. The substance must have the required softness and tenacity, so as to adhere readily to paper, when rubbed over it or against it. To form the crayons a wooden block is used that has half a dozen or more cylindrical holes of the intended diameter of the crayons bored through it, and these

are filled with the crayon mass, and the mass is then pushed out of the holes by means of well-fitting plugs, the crayons cut into proper lengths and dried. All the materials used for making crayons must be in palpably fine powder and no gritty substance used under any consideration. The best formula we know of for making crayons is as follows:

1. Take pipe clay (kaolin) or equal parts of pipe clay and finest prepared chalk and sufficient color to suit. Make into a paste with pale ale, not too old or musty, and put into the forms described.

2. Take equal parts of floated pipe clay and finest prepared or floated chalk, add the required coloring and mix with hot sweet ale, in which has been dissolved a few small pieces of isinglass to a stiff paste, which put into the forms.

To color the crayon mass, use the following: For black: Graphite, ivory black or lampblack. Blue: Prussian blue, ultramarine blue or indigo. Brown: Burnt Turkey umber or Cassel brown. Green: Chrome yellow or ochre mixed with Prussian or ultramarine blue. Purple: Madder lake and ultramarine blue. Red: Vermilion or red lake. White: Add a tinge of ultramarine blue to the mixture of clay and chalk. Yellow: Indian yellow or zinc yellow. Crayons for writing on glass may be made by cutting French chalk into suitable pieces.

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Cleaning and Relacquering Brass Chandeliers.

We need hardly dwell upon the well-known fact that the first essential is and everything depends upon having the brass free from grease and dirt. Unless you are very careful on this point you will never be able to obtain good color for this class of work. The chandeliers should be taken down and taken apart and the parts boiled in a strong solution of pearlash until apparently clean, then placed into a vessel containing a solution of one part of aquafortis to four parts of water, letting them remain in this solution for about one hour, when they should be washed or scoured in clear water with a brush until every part is clean. Now make up a solution of equal parts of nitric and sulphuric acid and add to this about one-third part of nitric acid in which has been dissolved some zinc in the proportion of one of zinc to three of acid. When this mixture comes to a boil, dip in the parts until they acquire the color you want; one-half minute will usually do it. Rinse the parts well in clear water and dry with sawdust. Do all this work out of doors on account of the fumes of the nitric acid. When dry, rub the parts with soft rags and leather, and when heated sufficiently apply the lacquer. A good lacquer is made as follows: Bleached shellac, 8 ounces; gamboge, $\frac{1}{2}$ ounce; alos, $1\frac{1}{2}$ ounces; alcohol, 1 gallon.

Place the ingredients in a well-corked bottle and shake occasionally until dissolved, then strain through cheesecloth.

Lacquer the exposed parts only, and in applying the lacquer use only the very tip of the brush and do it with a steady hand. Before lacquering, handle the parts with a piece of clean cloth, and never handle lacquered work until entirely cold.

Remember that the brass must be heated before the lacquer is applied, but not to such an extent that the lacquer is burned.

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Gilding on Glass—Size for Laying the Leaf.

It is best to use the pure gold leaf for gilding on glass; otherwise gold bronze powder might as well be employed. The isinglass size is best for gilding on glass, be the work smooth or embossed. We have never known any quick varnish size to hold gold leaf on glass for more than one or two seasons, no matter how well the work was backed up, while pure leaf laid in isinglass size double we have known to have remained on exposed show windows for ten to fifteen years. Much, of course, depends on the backing, and too much scrubbing of the signs will destroy the backing in undue time.

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Color Combinations for the Walls and Ceilings of Hotel Rooms.

The following suggestions are given for rooms intended as bedrooms, therefore you do not want any loud color combinations nor dark somber colors, but rather soft, delicate tints, and would give you the following as a suggestion:

Wall, subdued orange; ceiling, bluish green; picture molding, silver bronze; woodwork, salmon.

Wall, bluish purple; ceiling, orange tint; picture molding, gold bronze; woodwork, Tuscan red.

Wall, red purple; ceiling, yellow green; picture molding, gold bronze; woodwork, Tuscan red.

Wall, greenish tint; ceiling, light blue tint; picture molding, silver bronze; woodwork, pea green.

Wall, lavender blue; ceiling, silver green; picture molding, gold bronze; woodwork, lavender blue.

Wall, carnation red; ceiling, silver green; picture molding, gold bronze; woodwork, flesh color.

Wall, old gold; ceiling, blue-gray tint; picture molding, silver bronze; woodwork, cream.

Wall, old ivory; ceiling, light sky blue; picture molding, silver bronze; woodwork, ivory tint.

Wall, primrose yellow; ceiling, ultramarine tint; picture molding, silver bronze; woodwork, white.

Wall, warm pinkish gray; ceiling, green-gray tint; picture molding, gold bronze; woodwork, white.

Wall, dove gray; ceiling, light gray tint; picture molding, gold bronze; woodwork, light gray.

The combinations named are simply given as an index of what colors would work well together, but you must consider the amount of light that each room would have and arrange the depths of your tints accordingly. The furniture of the rooms should also be considered, and the paint of the woodwork should be in harmony with that of the walls, unless the woodwork in all of the rooms is to be alike, say cream color, ivory or clear white. Eggshell gloss finish looks better than full gloss; it appears more velvety.

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Colored Transparent Varnish for Coating Incandescent Lamp Globes in Various Colors.

The quickest method is to employ thin spirit lacquer, which may be made by dissolving aniline colors in alcohol, filtering the solutions and adding the same to a solution of gum sandarac in alcohol.

For red, use eosine; for green, aniline green; for amber, a mixture of aniline yellow and Bismarck brown. Less than one ounce of these dyes will be required for coloring enough lacquer to dip twenty globes. For preparing sufficient lacquer for the three colors, powder one pound gum sandarac of the pale variety, place in a stoppered bottle with two quarts of 95 per cent. spirit, put in a warm place and shake occasionally until the gum is dissolved; then add one-half pound clear Venice turpentine and filter. To hasten the solution, the bottle may be placed in a bath of warm water. Divide the resulting solution into three portions, and add to each the previously prepared alcoholic solutions of aniline colors until the lacquer is of sufficient strength to suit your ideas, which you can readily test by dipping a piece of clear glass into the same. By following this plan you will obviate the use of an oven to dry your globes after dipping and obtain a more brilliant effect than by employing copal varnish.

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Lining on Water Colors.

The best method of lining on water colors is to use the same size as for the body color, and draw your lines quickly along the straight edge, always using camel's hair pencils of the proper width. In order to get along unhampered, have your pot of color fastened to a belt around your waist.

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Molds for Casting Plaster Ornaments.

The latest and most favored molds for plaster casts are a combination of glue and glycerine, and the mass is prepared as follows: In a suitable kettle place five pounds of good glue with five pounds of soft or rain water, and allow it to stand for twenty-four hours. Now pour off the superfluous water and place the kettle into the water bath, i. e., into a larger kettle that contains boiling water or into a regular apparatus designed for melting glue. When the glue so treated has become liquid, add to the above quantity three pounds crude glycerine and twenty-five grammes salicylic acid and stir the mass well, so as to obtain an intimate mixture. This done the liquid must be filtered through fine cheesecloth into a clean vessel and when the foam has disappeared, the mass may be made into molds, but the procedure must be necessarily slow in order to prevent foaming and thereby avoid defects. The mold can be taken off only when it has cooled thoroughly and become hard to the touch. In taking off the mold, it is cut into suitable sections with a sharp knife, which are, when casting, set together again and held with cords or wire. As

soon as these molds have become cold they must be coated with talcum first and then be given two or three coats of copal varnish, slightly thinned with turps. This treatment makes the mold water repellant, as well as proof against the possible damage that might result from the casting of the plaster, respectively the heating up of the same during the hardening of the cast.

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Creosote Shingle Stains.

Although but one manufacturer can use the word "creosote" in connection with shingle stains, as he has the name protected by letters patent, this, however, will not prevent others from making a stain with creosote as the vehicle, under another name.

The preparation of such stain is very simple, and requires but little experimenting, but some knowledge in the selection of pigments is necessary. Aniline colors, of course, would keep in suspension best, but are undesirable, because of their fading tendency on exposure, while the fast coal tar colors are most too expensive. Therefore the best plan is to select oil colors of the greatest strength and firmness, break them up to a thin paste with boiled linseed oil and sufficient oil drier to impart drying property and thin out with creosote oil to the consistency of milk. For instance, to make a reddish-brown shingle stain take one pound of Venetian red, medium shade, break it up with a gill of oil drier or liquid drier, free from rosin or other gum, and a gill of boiled linseed oil, and add to this enough creosote oil to make one gallon of stain. If not strong enough, use a greater portion of Venetian red or use a stronger red oxide. The same method may be followed to obtain the various colors or effects, but in order to keep the pigment from becoming solid by the stain standing in the package for some time useless base material must be avoided, and only colors of the greatest tinting strength and fineness selected. Pigments or colors containing admixtures of barytes, silica, clay, etc., will not answer in such stains, nor will ultramarine or imitation of cobalt blue hold up sufficiently. Lampblack, Prussian blue, sienna, raw and burnt; umber, raw and burnt; red oxide, a high grade of mineral brown and yellow ochre are best suited for coloring matter, and where white is required along with color for certain tints it is best to employ zinc white.

In cases where the water from shingle roofs is not collected for drinking purposes, chrome yellows and chrome greens may be employed in the stains. If desirable to cheapen the stain, a portion of the creosote oil may be replaced with benzine (petroleum naphtha) or with kerosene.

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What Is Water Lime and What Is Its Value in Paint?

The following formula was found in an old book on painting for making outside paint: One part in bulk of water lime ground fine and two parts in bulk of white lead in oil, thoroughly mixed.

The author of the book in question used the term water lime to describe water slaked lime, to distinguish it from air slaked lime. When caustic lime has been thoroughly slaked with an excess

of water and allowed to stand for a few days and the clear surplus water drawn off, you have the material he refers to. This material, when ground fine in a mill, will present a pulp not unlike ordinary whiting that has been mixed with pure white lead that has been ground in oil, but in order to mix well the white lead should be first reduced to a consistency similar to that of the water lime with oil, and when both are thoroughly mixed by stirring the resulting paint must be reduced to the right consistency for application with linseed oil and the necessary driers. While we do not recommend such dilution of good material, we do not hesitate to say that for rough work a paint made on such basis is a better paint than one that is loaded down with other make-weight materials or made up with impure oils.

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Does an Excess of Turpentine in Oil Paint for Exterior Use Cause the White Lead to Blacken More Rapidly?

While an excess of turpentine has no effect whatever on white lead directly, it is self-evident that as turpentine has no binding properties it will tend to shorten the life of outside paint in proportion to its use in the composition of such paint. When outside paint has lost its gloss, it means the beginning of the disintegration or perishing of the paint, and when white paint begins to powder or chalk, it usually turns gray, which is termed "blackening."

It stands to reason, then, that when the paint has been made with pure linseed oil of good body and little drier only, it will hold its gloss and color much longer than it would if the body of the oil had been cut out by the addition of spirits of turpentine.

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Is the Use of Oxalic Acid Solution as a Stain Remover Injurious to Subsequent Coats of Paint or Varnish?

The top of a stand had been scraped and sandpapered and after some black spots or stains on it had been treated with oxalic acid to bleach them, washed with water, and then dry sandpapered, filled and varnished, yet when the varnish was lightly rubbed, it shoved off from these spots.

We have never known subsequent coats of stain, filler or varnish to be injured or kept from drying properly on spots where oxalic acid solutions have been used, even when the wood was not rinsed with clean water after treating with the solution, provided that enough time was allowed for the surface to dry out thoroughly, and we are inclined to believe that the blackened spots were rather spongy and did not dry sufficiently before the filler and varnish were applied, and that the sealed up moisture caused your varnish to rub off, because it failed to obtain a proper hold on the spots in question.

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Cheap Blackboard Slating for Plastered Walls.

The cheapest way to make a blackboard on a plastered wall is to smooth sandpaper the surface first, then give a coat of lamp-black ground in oil, thinned with boiled oil and liquid drier; when

dry give a second coat of lampblack in oil, thinned with equal parts boiled oil and turpentine, to which some drier is added. When this is thoroughly dry, give a coat of drop black in japan, thinned with turpentine only in order to make a dead flat surface. In order to have this last coat bind properly, a tablespoonful of coach varnish should be added to one pint of the thinned paint, which should be applied quickly and evenly with a good, wide, flat varnish brush, so that no laps are visible.

Another cheap paint for renewing old blackboards may be made by mixing silicate of soda with its own bulk of soft water and adding to this enough lampblack that has been ground in water to color this solution.

The blackboard to be renewed must, however, be thoroughly cleansed before applying the paint.

— 390 —

White or Obscuring Acid for Glass Embossing.

A mixture of one-third fluoric acid and two-thirds liquid ammonia. Must be kept in leaden or gutta percha bottles.

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Silvering Glass Without Heat.

There are a dozen methods for silvering glass, which have been at various periods described in scientific journals, but we shall here describe a few only, which strike us as being simplest of execution and most promising of success in the hands of the beginner. We will preface the description of the process by the remark that in each case a shallow pan or dish, but little larger than the plate of glass itself, is required for holding the silvering solution, and at least one-half inch deep, with a perfectly level bottom. The most ordinary method is as follows: First, making reducing solution A by first dissolving and then boiling 12 grains Rochelle salts in 12 ounces of distilled water. While this is boiling, add 16 grains nitrate of silver dissolved in 1 ounce water and boil ten minutes longer, take from fire or flame and add enough cold water to make 12 ounces in all. Next make silvering solution B by dissolving 1 ounce nitrate of silver in 10 ounces distilled water, add slowly liquid ammonia until the brown precipitate is nearly, but not quite, all dissolved, then add 1 ounce 95 per cent. alcohol and sufficient water to make 12 ounces in all. Take equal parts by weight of solution A and B, mix them thoroughly and cover the bottom of the silvering dish with the same, and lay the glass, which has previously been cleaned with soda solution and rinsed with clear water, while still wet, face down into the mixture; let it remain in the dish or pan for about twenty minutes or thereabouts, rocking it gently near an open window, then take out glass and stand it on edge to drain. The solutions should stand a few days before being used to allow them to settle, and distilled water should be used in making them. One dram each of the solutions will be required for each square inch of surface. Another process is Draper's method, which is described in the following:

Dissolve separately 500 grains Rochelle salts in three ounces distilled water and 800 grains nitrate of silver, also in 3 ounces of water. Add of the silver solution to 1 ounce strong liquid ammonia until brown oxide of silver remains undissolved. Then add alternately ammonia and silver solution carefully until the nitrate of silver is exhausted, when a very little of the brown precipitate should remain, and filter. Just before using add the Rochelle salt solution and dilute the mixture with distilled water to make 22 ounces in all. Clean the glass or mirror with nitric acid or plain collodion and tissue paper. Coat a tin pan of suitable size with beeswax and rosin, equal parts, melted together. Fasten a stick one-eighth of an inch in thickness across bottom of pan and pour in the solution. Put the glass in quickly face downward, one edge first; carry pan to open window and rock the glass slowly for half an hour. Bright objects should now be scarcely visible through the film. Take out the mirror and set on edge on blotting paper to dry, and when thoroughly dry lay it face up on a dusted table. Stuff a piece of thin, soft buckskin with cotton loosely and go over the whole surface with this rubber in circular strokes. Put some fine rouge on a piece of buckskin and impregnate the rubber with it, polishing the silver in small circles, going gradually over the whole surface. After one hour of continued rubbing the surface will be polished perfectly opaque and, with care, free from scratches. It is best, before silvering, to heat the solution and the glass in water of 100 deg. F.

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To Keep Shellac Varnish from Gumming Up Under Application.

Probably the best remedy would be to thin the shellac varnish with sufficient alcohol to make it flow and work more freely, but that will entail a loss of body, which is not always desirable.

If you add to one gallon of shellac varnish one pound Venice turpentine or Canada balsam, and sufficient alcohol, you will find that it will flow more freely, though it will harden more slowly.

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Sign Painters' Measurements and Prices.

Sign painters, in making prices, charge so much per lineal foot for all glass, muslin, oilcloth and board signs, considering the height of the letter and style of letter, as well as color, adding 25 per cent. for shading. Lettering in gold is always 50 per cent. more than plain lettering. Wall signs are measured by the square foot, and japanned tin signs by their size.

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Glaziers' Putty that Will Not Crumble Nor Give Trouble in Reglazing.

Although there are still some pure linseed oil and whitening putties on the market, you have evidently had none of them. Most putty is made from a mixture of whitening and marble dust, or marble

dust and putty oil alone, and you may imagine what putty oil is. The latter is a substitute for linseed oil to be used in making putty and may be recognized by the grease it leaves on top of the putty after glazing. The compounds made of marble dust may be identified by the shortness of the article and its lack of elasticity in working under the knife. The presence of putty oil (mineral oil, etc.) can be detected by the odor, when a small portion of the putty has been rubbed briskly between the hands. If you cannot obtain pure linseed oil and whitening putty under a guarantee, prepare it yourself as follows:

Have some fine bolted American Paris or bolted gilders' whitening on a strong bench, mixed with raw linseed oil and knead it into a stiff dough. Add all the whitening you are able to get into it and pound it with a club or mallet for some time, until it is thoroughly kneaded. Lay it aside in a warm place exposed to the air of the room for three or four days to sweat; then put back on the bench, knead and pound again, until it is good and pliable. If too soft add more whitening, but no more oil. The kneading, pounding and subsequent sweating is the most important feature in producing good putty. The usual proportions are 85 pounds whitening to 2 gallons of linseed oil.

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An Experience of Paint Flaking from a Priming Composed of Remnants.

A painter in Denver, Col., wanted to know why a certain brand of paint that had stood well on some operations, flaked on certain exposed parts of a large dwelling, leaving the priming intact. His priming he always makes from the remnants of other jobs.

So long as your paint and oil have stood well on other operations, we may say that in your climate the material may be an excellent one, although a combination paint, and while it might have a tendency to flake under ordinary conditions in a hotter climate, we do not think it the fault of the surface coats, but would ascribe the trouble to the composition of your priming. Without entering into the nature of your priming material particularly, we would say that it is a failing with many painters to think that anything is good enough for priming new wood. We beg to differ with them in believing that priming is the very foundation in painting, especially exterior wooden surfaces, and that nothing is so good as strictly pure white lead and raw linseed oil for that purpose. From the brand of paint you are using we can judge as to the pigment contained in the remnants of other jobs which, you state, you use for priming. Zinc white and barytes are not good pigments for a priming paint, nor are fatty oils and japan good vehicles for the same. And oil in remnants of paint that stand around for some time will become fatty, especially in the presence of lead salts that are contained in driers. Fatty oil in paint will sweat and come to the surface, and we rather think such action has been instrumental in throwing off the surface coats from the priming.

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Size for Rough Plastered Walls to Be Papered.

Liquid glue is the best size for rough walls, when they are hard. Apply the glue size and let it dry hard; then knock off the sandy grains with sandpaper and fill rough places with plaster of paris putty. Sandy walls should be leveled with a thin coat of kalsomine, and, this being dry, a thin coat of glue size should be given. Let the glue size become hard, then put on the paper with light paste, and be careful to brush or pound down the paper carefully, as rollers will not work on rough walls. To make a first-class job, lining paper should be applied to rough walls, and we presume that you have experience in that line.

Liquid glue is made by soaking good, white glue in water over night, then melting it in the usual way and have it of good consistency. Put it, on cooling, into a wooden vessel and stir into the mass nitric water to desired consistency.

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What Caused Paint from the Same Package to Vary in Shade on the Body of a House and Its Annex?

A large square dwelling, with a kitchen annex was painted two coats Colonial yellow with light olive trimmings. The sides of the house were weatherboarded, while the kitchen was sheathed with vertical boards ten inches wide, the joints being covered with four-inch batten strips. When the work was finished the kitchen annex appeared three shades brighter than the body of the house, and there was no contrast between body and trimming color.

You neglected to mention whether you painted the kitchen body in one color, or whether you did not paint the four-inch strips with the trimming color. From what you give as the result we assume that you painted strips and all with the Colonial yellow. The kitchen, having no trimming, will appear lighter, because there is nothing to subdue the bright yellow, as is the case with the house. The selection of light olive as a trimming for the yellow is what causes the effect you describe, as olive harmonizes with yellow, but does not make a contrast. When yellow is trimmed with olive the two tints or colors appear altered—the yellow appears deeper, the olive lighter.

This and the crosswise running of the grain of the timber strikes us as the cause of the varying result.

— 398 —

Bleaching Darkened Wood With Chloride of Lime and Soda Solution.

A painter who had tried the formula given in No. 374 found it turned the wood dark and wanted to know the trouble and a remedy for it.

Did you read the formula given in the October issue correctly and follow the directions carefully? If so, the whole surface should not have become dark, even if the black spots did not yield to the treatment. The oxalic acid solution should have restored the color of the balance of the surface, even if some of the muriatic acid and tin solution, being too strong, darkened it. We are afraid that

your yellow pine wainscoting is very sappy, and that it is the sap which is the real cause of discoloration. Make a solution of $17\frac{1}{2}$ ounces chloride of lime and 2 ounces soda crystals (sal soda) in $10\frac{1}{2}$ ounces of water, and keep the surface saturated with this for at least fifteen minutes. When the wood is light enough, wash off the chlorine with dilute sulphuric acid, very weak—say one-half pint acid to one quart water—then rinse with clear water.

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How Stove Blacking May Be Prepared.

Commercial stove blacking paste is usually made by grinding graphite in water through a mill to impalpable fineness. The paste is placed in forms and dried by heat. In using it is mixed with water, applied wet, permitted to dry and brought to a polish with brush or cloth.

A better grade of stove polish is made by mixing finest pulverized graphite with its own weight of spirits of turpentine and adding for every pound of graphite used one ounce of water and one ounce of brown sugar. This is pressed into forms and allowed to dry.

Liquid stove polish is made by mixing one part, by weight, of finely powdered bone black and one part, by weight, of pulverized graphite with two parts, by weight, of pulverized copperas, to which enough water is added to form a creamy paste.

— 400 —

To Clean Off Smoke from Plaster Paris Ornaments.

The simplest method is to make warm soapsuds, to which a little ammonia is added, say one tablespoonful of household ammonia to a quart of the suds, and apply to the ornaments with a soft brush. When clean and white, rinse thoroughly in clear water. If this treatment is not effective enough, make milk of lime (a little air slaked lime in water, which has the color of milk) and immerse the ornaments or figures in this for some time; then wash with clean water and, when dry, dust on some fine French chalk with a painter's duster or blender.

Benzol and spirits of turpentine are also highly recommended for cleaning plaster ornaments, but we should prefer to use the soapsuds to any other treatment.

— 401 —

How to Obtain a Rich Wine Color Effect in Refinishing Old Furniture.

In refinishing furniture the most economical method is to sandpaper down to below the old varnish, until a good surface is obtained, even if it is rubbed through to the wood in certain places. Such spots must be touched up with the proper stain, but, of course, water stain cannot be of service here. Use a quick drying oil stain, made from rose pink in oil, drier and turps, or, if price will permit, use rose madder. With this stain touch up the bare spots first, then go over the whole surface with the stain. When this is dry, give at least one coat shellac varnish, which sandpaper lightly, then apply

two coats of cabinet rubbing varnish, which rub down with pumice and oil and polish with rotten stone and sweet oil. If this method is too expensive and tedious, omit the oil stain and shellac, and in its place apply, after touching up bare spots, one coat of color and varnish made by mixing enough rose pink in japan with furniture rubbing varnish to give desired effect, and on this give a coat of finishing varnish, which you can moss down and polish in the usual way.

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Removing Paint Spots and Stains from Stone and Cement Pavements.

Make two solutions as follows:

1. Place one-half pound of lime in a suitable vessel and slake the same with as little water as is required; then add one-half pound of caustic soda (98 per cent.) and one quart of water. Stir a while and let stand to cool.

2. In another vessel slake one pound of quicklime with as little water as is necessary to make it fall into a powder, then add one quart water. Cover the vessel and let stand to cool down.

When the heat is well off, strain both solutions through a paint strainer; then mix the two, stirring well.

Now, boil one-half pound wheat flour in one quart of water to a thick paste, but have no lumps in the same.

While still hot, under constant stirring, in order to prevent lumping, slowly pour the combined solutions, No. 1 and No. 2, into the paste, and when cool you will have a medium stiff paste, which will, when applied to the thickness of one-sixteenth of an inch, remove any oil or varnish paint in from thirty to forty-five minutes from wood, iron, cement or stone. When the paint is removed, the surface should be immediately washed with strong vinegar or acetic acid to destroy any caustic matter. If the wood is somewhat discolored, it may be bleached with a strong solution of oxalic acid in water. Great care must be taken in preparing the material to prevent it from coming in contact with face and hands. Should be applied with trowels, or fiber brushes, or cotton waste swabs, as it will destroy bristle brushes in short order.

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Venetian Red in Oil Turning Dark on Being Exposed for a Short Time.

Venetian red is an oxide of iron, more or less diluted by a natural gangue. Gangue is the native earth, silicate of alumina, lime, manganese, sometimes magnesia or anything in that line that is associated in nature with the red oxide of iron. Venetian red may be a native red or it may be made artificially from copperas (sulphate of iron) with oyster shell lime or limestone in a furnace and may range anywhere from containing 10 per cent. to 60 per cent. of ferric oxide; but in order to prove permanent in color, it must not contain any free sulphuric acid or any free sulphate of iron.

You speak of English Venetian red as against domestic Venetian red, which is quoted as being equal to the former, and we would say,

that there are domestic reds which equal or even excel these, but it is for you and your fellows to determine the difference. The imported Venetian reds vary as well as the domestic brands, and once in a while either of them will give very bad results. Very much depends upon how these reds are mixed, and under what conditions they are applied. In a damp locality, where there is little or no sunlight, they soon turn dark and tend to blackening. This is usually called mildewing, but the same mixture applied where there is light and air stands well. Then there is a great deal in the way of mixing, grinding, and eventual thinning. Oxide of iron paints are prone to discolor the oil by giving off to the latter some of their oxygen, turning the oil dark on long standing. Another bad feature of Venetian reds is, if they contain more than a small portion—say, over five per cent. of carbonate of lime—they are very easily affected by sulphur gases, which attack the paint, first the oil and later the pigment. If you have the dry material from which the paints you mention are made, test the same by pouring hydrochloric acid over it, and if there is no effervescence there is no carbonate of lime present. In such case, take some of the material, put into a beaker glass and fill the glass with distilled water; stir well and let the pigment subside. Then insert litmus paper, and by this test ascertain whether there is any sulphate of iron present; the presence of lime will be demonstrated by the hydrochloric acid test.

Railroad chemists, as a rule, confine the percentage of carbonate of lime permissible in an oxide of iron red to less than 10 per cent. and for good reasons. Carbonate of lime, in paint, will be affected by sulphur gases as soon as the oil loses its hold and is turned into sulphate of lime, and because of the molecular change the paint loses its hold on the surface and powders off. The same action is the cause of the darkening of mineral or Venetian red in the presence of too much carbonate of lime.

— 404 —

Exterior Painted Work Spotted After a Severe Rain Storm in Winter.

Several jobs painted in the summer, some with pure lead and oil and others with different makes of high grade prepared paints spotted badly after severe rain storms in the following December. contain a goodly portion of turps and driers.

We always believe in a case of this kind that the best policy is to wait until the storm has subsided, and the painted surface given an opportunity to dry out again; then to examine the same thoroughly from every point of view on all sides. A bottle of a mixture of three-fourths of bodied boiled linseed oil and one-fourth turpentine and a small piece of sponge or flannel cloth will do good service. First wipe off with a cloth and a little benzine or turpentine the dust, dirt or soot that has settled on the surface; then take your sponge or flannel, saturated with the mixture in the bottle, and rub briskly over the spotted surface, and if this does not make the spots disappear and renovate the paint then the paint has perished wherever the spots appear. Linseed oil paint, at best, is rather porous, that is not proof against the infiltration of water, and when the hot summer and fall months have had full sway upon it it is hardly able to withstand the ravages

of a winter storm, especially in spots where the sap has been pulled out by the hot sun; more so, when paints have been employed that contain a goodly portion of turps and driers.

— 405 —

Cause of the Curdling of Japan Colors When Raw Oil Is Added.

The fault may be in the japan in which the colors are ground in some instances, but not in all cases. There is not a single japan color that will mix well with raw oil, unless the color is first thinned with turpentine to the consistency of thick cream, and even here, if the pigment is of great bulk, like lampblack, drop black or lakes, there is a decided tendency to curdle. We would attribute this partly to the great proportion of japan or varnish required in grinding those bulky pigments and the consequently greater resistance to mixing with oil and partly to the presence of moisture in raw linseed oil. A strong boiled oil or fatty varnish, it will be noted, mixes very readily with such colors and many letterers or stripers use slow drying coach varnish to make their lettering or striping colors flow freely from pencil or brush.

— 406 —

How to Stain and Finish Flemish Oak.

Flemish oak is a nearly black effect, without either the brownish or bluish tinge, therefore the stain must produce a greenish black tone. A strong decoction of green walnut shells applied repeatedly will best bring the desired effect. If not deep enough, a solution made by dissolving sulphate of iron (green copperas) in water or by steeping iron filings in vinegar for a few days is applied over the walnut shell decoction until the proper depth of color is secured. Such stains penetrate more deeply, do not hide the grain and produce the aged appearance, which oil or pigment water stains will not give. Articles of small size may be most effectively stained or aged by placing the pieces in an air-tight chest with a shallow dish full of liquid ammonia, but it requires more attention and time.

After the wood has assumed the desired color allow it to dry in the air, and color some good paste-wood filler with raw umber and drop black; thin the same with turps to the consistency of varnish, and apply with a varnish brush of appropriate size. When set, wipe off the surplus filler with cotton waste, excelsior shavings or flax tow across the grain and allow the filler to harden; then sandpaper and dust off. Now proceed as you would in finishing any other style of oak, according to the price obtained for the work, or as per specifications.

It is always desirable in finishing Flemish oak to give at least one coat of orange shellac varnish to seal up the filler before applying the varnish, and it would be a waste of money and time to apply two coats of white shellac varnish, which would certainly be required, as the white shellac is not as good a sealer. The shellac coating should be rubbed down with No. 0 sandpaper, but care must be taken not to rub through the coat. When this sandpapering is done, the work is ready to be varnished in any manner desired.

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Softening and Utilizing Paint Skins.

When the skins are very old, dried up and hard like stone, it is cheapest to throw them on some dump, but when they are merely tough and appear dry without being like so much hardened cement, they may be cut up with a chopper, placed in a kettle over a fire, with a small quantity of oil and boiled at low heat, while continually stirring, so that they will not scorch on the sides. When the lumps are well broken up and soft, add more oil and boil further; then take kettle from fire and put the material, while still hot, through a paint strainer. If not fine enough, run through a paint mill, then thin with oil and turps to proper consistency for application, adding, if required, a small portion of driers. This makes a very elastic and durable paint for roofs, fences, etc., but it is not safe to use for priming new wood work. If the skins are fairly soft, they may be dissolved in a solution of one pound of sal soda in four gallons of water, which will require from six days to two weeks, if stirred occasionally, and finally put through a paint strainer, after pouring off the water. Paint so made can be utilized for rough work, such as painting barns, fences, etc., only, and is unfit for priming new work.

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Graining Woodwork in Imitation of Mahogany.

Make your ground color of two parts of orange chrome yellow in oil and one part bright Tuscan red in oil, and thin with turps and a little drier so as to dry with eggshell gloss only. Apply two coats for new work, so that the wood is well covered. For the graining color use a rich burnt sienna and a little Vandyke brown, both ground in ale or beer for distemper graining, and if the effect is not rich enough add a trifle of madder-lake, also ground fine in the same vehicle. Thin the color for spreading with stale ale or beer, and before applying it saturate a sponge with the same liquid and dampen the ground all over. If two coats of ground do not cover up solidly, give a third coat, but in that case let this coat dry out with more than eggshell luster. The tools required are a sponge or cloth or a piece of buckskin for wiping out the lights; an ordinary paint brush to put on the color, a blaze stick to make the bright blazes in the center of the branch. This may be made from a piece of wood shaved down thin, or a paper card, three inches long, one inch wide and very thin. A blender to soften the work, and a top grainer to put in the dark grain. Spread on the color with the brush, after dampening the ground work, and blend crosswise. Wipe out the lighter parts with sponge or cloth, then blend again, until softened, and put in the blazes through the center with the blaze stick. Now blend down the crude roughness of this lengthwise; when dry, rub off the rough particles with a soft cloth and give a coat of thin varnish, a quick rubbing varnish being best.

Next a glaze, made by adding a trifle of asphaltum to the graining color and reducing it to a very thin consistency with ale or beer, is rubbed out well over the whole surface, and blended crosswise, then

stippled with the blender. When dry, the dark top grain is put on. To finish, a coat of hard drying coach varnish is flowed on with a thick badger brush.

The style of grain varies, and it is best for the beginner to study the grain in the natural wood and imitate this as closely as possible. In panel work, crotchching generally is resorted to; the cutter is used to take out the lights and the fine lines put in with the overgrainer, used almost in its normal condition without being broken up into teeth, the lines running in a wavy pattern across the panel, like the inverted letter V.

— 409 —

How Golden Oak Paste Filler Can Be Made.

The effect in oak finishing, known as "golden," is not produced by the filler alone; in fact, the filler has very little to do with the result. The wood must be stained before it is filled, and of course, the filler must be so colored or stained as not to mar or dull the effect. A mixture of gold size japan and genuine asphaltum varnish in about equal parts, thinned with turpentine, makes a good stain that will not raise the grain of the wood, dries quickly and hard, and if wiped out properly, gives under varnish a rich effect, termed "golden," for want of another appropriate name.

To make a filler, mix one-third each of raw linseed oil, japan gold size and turpentine, and put into this mixture enough finely powdered silica or silex to make a stiff paste, and color this with burnt umber in oil, Vandyke brown in oil and a trifle of drop black to suit, being mindful that in golden oak only the high lights are yellowish brown, while the filled grain is decidedly dark. The mixture should be run through a handmill. The best plan for you is to buy your golden oak paste filler, or at least buy the light paste filler and color it to suit your taste; for you cannot buy the raw material as cheap as the manufacturer, and making it in a small way will cost you more in the long run.

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Refinishing Yellow Pine in the Natural Effect or with a Transparent Stain.

One coat of liquid filler and two coats of varnish were used on yellow pine; but the work scaled in some places and powdered in others, while some places remained hard and intact. A method of doing the work over to obtain a uniform effect was desired.

Liquid fillers are not made for such woods as yellow or Southern pine, and cannot withstand the sappy or resinous character of this wood. Shellac varnish is the only substance that should go next to it. The only remedy in this case is to take off all the varnish and filler clean down to the wood. Two parts of strong liquid ammonia and one part of turpentine applied with a sponge to soften varnish and filler and the use of a sharp scraper will remove the objectionable coating, and, this accomplished, the surface should be washed down with clear spirits of turpentine or with vinegar and allowed to dry. Then if there are discolorations in the wood, a coat of orange shellac

varnish to which an alcoholic solution of turmeric and dragon's blood has been added, should be given, before any varnish or hard oil finish is applied. To make the coloring solution, put one ounce of turmeric powder into one pint alcohol, digest four days, shaking occasionally and strain for use. Also put one ounce dragon's blood into one pint of alcohol and dissolve like the other. Color the shellac first with the turmeric and alcoholic solution and add enough of the dragon's blood and alcoholic solution to give the proper depth. Try it first on a small scale to find out the proper proportions. This will save one coat of stain and will not obscure the grain of the wood. On top of this a coat or two of good hard oil finish will give a lasting and durable result, unless the work is exposed, when spar varnish should be employed in place of hard oil finish.

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Finishing Whitewood and Birch in the Natural with a Wax Polish.

The specifications called for the hall, dining room and bath room of a dwelling to be finished natural, using a certain brand of wax polish. The hall was whitewood, the other rooms birch veneering. The makers of the wax polish said to use one coat of a certain preparation to enliven the wood, one coat white shellac varnish and one coat of wax, rubbed on and polished. The painter, on trial, found this required an extraordinary amount of labor, yet did not make a satisfactory job. He thought the best method of finishing to produce the desired effect would be to give two coats of shellac varnish and one coat of rubbing varnish, rubbing the latter with pumice and oil and polishing with rotten stone and oil, and asked for advice.

As a matter of fact, we believe, as you do, that a wax polish is not the proper thing to put on the woodwork of a bathroom, as it is too easily marred and does not stand contact with water, and, for that matter, does not suit well for the other room or the hall either. At any rate, one coat of shellac over an enlivener, and one coat of wax over this does not make a good finish. A first-class finish can only be obtained when the varnish has been rubbed, then polished with rotten stone and oil or water, and then lightly waxed. We would suggest that you give both whitewood and birch veneering two coats of white shellac varnish; when hard and dry, smooth sandpaper the surface, then rub with pumice and oil lightly, and finally polish with rotten stone and use sweet oil, giving a dull finish. Or omit the polishing with rotten stone and use beeswax, dissolved in turpentine to a paste. In any case, polishing is tedious work and requires much labor and a great deal of patience. We may as well add, however, that the quickest and safest method is to give one or two coats of shellac varnish, which are lightly sandpapered; then one coat of a good, pale rubbing varnish, which may be rubbed or haired down with F. F. pumice and oil or water, and then polished with rotten stone and oil, to either a dull or high finish, as the requirements may be.

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Cause of the Peeling of Paint on New Spruce Timber.

A Canadian painter wrote that in his locality paint would usually blister and peel in a year when applied to new spruce clapboards, but

he has had jobs that stood several years, due, he believed, to the fact that he usually does not apply paint until after the woodwork had been up for several weeks.

There is not any doubt whatever in our mind but that the blistering and peeling in so short a time is, to a great extent, caused by the condition of the timber to which the paint is applied, yet, while it is a good idea to let the wood go unpainted for a time, we hardly think that a few weeks would be a great help toward seasoning, except in very warm, dry weather. We are rather inclined to believe that the original seasoning of the timber has a great deal to do with the result, but above all, that you are using a better material for priming than the other painters, who have had such poor results. Green wood and moisture are the causes for blistering in oil paints, but poor priming is usually the cause for the flaking or peeling. Boiled oil or fatty oil should never be employed in mixing paint for priming coats, nor should zinc pigments or ocher or other brittle earth paints be used to any extent. Pure white lead with lampblack, or pure white lead with a small portion of fine washed yellow ocher, thinned with pure raw linseed oil, a little turpentine and drier, make the best priming for new spruce clapboards.

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Blended Colors and Clouded Effects.

The tints are best laid side by side, graduating from dark to light or from light to dark, making the difference of each stripe as small as possible, and if proper distance be allowed for each stripe, there will be no dividing line, and blending will not be required. On the other hand, if it is necessary to have a marked difference in shade, the blender should be used, working the darker tints into the lighter ones. To do this properly requires practice; it cannot be described here how to handle the brush, but it is self-evident that the blending must be accomplished before the paint sets. Clouded effects are obtained by working one color into the other with a rotary motion, as, for instance, white into a sky-blue ground, leaving sharp outlines in the surface tint, but softening the effect by blending the white somewhat into the blue or the lighter tint or color into the deeper one.

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Hanging Burlap, Crepe and Buckram on Walls—Also Proper Paste for Same.

You may run your hangings all the way up to the ceiling, if you relieve the monotony by placing a molding at about 16 to 18 inches below the ceiling all around the room. The color of molding should strongly contrast with the color of your hangings, or you may run the fabric six or seven feet high, using a figured paper above. The paste should consist of one pound of good glue dissolved in two gallons of water, into which put enough paste powder to make a stiff paste; then add to the still warm paste two tablespoonfuls of Venice turpentine or Canada balsam and stir well. The paste powder consists of 84 parts, by weight, of wheat flour or starch; 8 parts, by weight, of caustic soda, and 8 parts, by weight, of sulphate of ammonia.

— 415 —

Filler for Yellow Pine.

The only filler for this wood is good, pure shellac varnish. Other substitutes will not answer, because there is too much sap in this timber. If good grain alcohol shellac is too expensive, use orange or brown shellac dissolved in wood alcohol, but do not substitute rosin for shellac. Every other filler will turn white or will eventually scale, taking the top coats of varnish with it.

— 416 —

Size for Aluminum Leaf on Wood.

We presume what is wanted is a size to lay aluminum leaf on wooden signs or other objects. For exposed work we would recommend an oil size, composed of heavy boiled linseed oil, to which a little white lead is added. The oil must be stringy and have a good tack, as in oil gold size. If you cannot get such an oil, take ordinary boiled linseed oil, put in a shallow dish and heat it over a flame. When boiling, remove it from the flame, allow to cool and then return it, repeating this operation until the oil becomes thick like syrup; then set the oil on fire, let it burn about a minute and extinguish the flame with a close fitting lid. When cool, add the white lead and thin with a little turpentine. For a quick size use pale gold size japan and add enough white lead to take the yellowish color from the japan. Thin with a little turps. Proceed as you would in laying gold leaf in oil size.

— 417 —

Polish for Restoring the Original Luster of Pianos.

We know of only one method to polish piano cases, and that is to rub fine the finishing coat of varnish with rotten stone and water, using the palms of the hands in the operation, which removes all scratches and leaves a bright polish, which is completely finished by rubbing with oil.

— 418 —

Imitation of Cherry Wood by Graining.

Follow the lines laid down in No. 408 on graining in imitation of mahogany, with the exception of making your ground of white lead, tinted with burnt sienna, and for the graining, color raw and burnt sienna, equal parts, darkened with a little burnt umber, all ground in oil, thinned with turpentine and japan drier, if for exterior work. For inside work, use the same ground, but for the graining color take burnt sienna, ground in stale ale or beer, stipple with the brush, making as fine a grain as possible. Then wipe out the heart pieces, not too many, as cherry has but little grain. When dry, glaze with burnt sienna and a little burnt umber in stale ale, and when this is dry, give a flowing coat of good varnish.

— 419 —

Enameling the Rough Outside Surface of Cast Iron Bath Tubs.

To produce a level surface you require an iron filler, such as is used on gas engines, of a color that is close to the finish you wish to apply. This filler must be of putty-like consistency, so that for very rough places you can apply it with a wide spatula, and thinning it somewhat with turps, like an iron safe plaster to less rough surface. This filler must be of such a nature that when applied heavy it will show no cracks, and yet have enough binder so that it may be rubbed with pumice. It must also sandpaper freely in from six to eight hours. When the surface is so prepared, any good grade of engine enamel will stand the action of hot water very well, because the outside of a bath tub will never become as hot as the cylinder of an engine.

— 420 —

Strange Case of Paint Peeling from House and Barn.

A house, built about ten years, had been painted three times. After the last painting it peeled badly. The first time it was painted it received three coats of white lead and color; the second time, two coats of red paint, and the third time two coats of light paint, which the painter said was pure lead and linseed oil. The trimming has always been cream color; it has peeled badly in places, while in other places it is badly cracked and furrowed. The barn, built four years, was painted twice, and is also peeling clean to the wood. As no red paint had been used on the barn, the trouble cannot be attributed to it.

The blistering and peeling of oil paints are caused, as a rule, by the same agencies, chief among which is moisture. Painting in damp or freezing weather will cause blistering and peeling. Green wood used in buildings, painting the exterior before the plaster inside of a frame dwelling has had time to dry out, may also be enumerated as among the causes that make paint peel or blister.

It is, under the circumstances, a very difficult matter to form an opinion as to the real cause of the trouble, and we should advise you, before undertaking the job of repainting, to make a very thorough examination of both house and barn, especially the gutters on roof and the nailing of the clapboards, if there are such; in order to ascertain that moisture cannot get in behind your new paint and possibly throw it off also. We think it barely probable that the trouble is due to inferior paint material, as the number of coats on the barn was insufficient to cause the paint to curl up by contraction of the outer coats and be thus thrown off. Nor would fatty or impure oil in the last paint cause the old paint to soften clean to the wood, and thus loosen the hold of all the coatings. We do not know of any paint remover that is as quick as the paint burner, and making as good a surface for repainting.

— 421 —

Paper Hangers' Paste for Porous or Spongy Walls.

It was found impossible to make paper stick to some spongy walls, although glue, glue and sugar, glue, soap and alum, have all been used.

If you have sized the walls, as has been suggested repeatedly in these columns, there must be something wrong with your paste or you may not have employed the proper kind of paste for the sort of paper used. We would suggest that if you have not already done so, you apply a glue size to the walls, after rubbing off with coarse sandpaper any roughness or sand that may show. On this size apply lining paper, which may be had at any wall paper store, or ordinary thin wrapping paper; even newspaper will serve the purpose, using a good flour paste, made by making a batter of wheat flour and cold water, adding to this boiling water until the paste becomes nearly transparent.

If the paste does not lose its opalescence with the boiling water, boil up under constant stirring over a slow fire until it does so. Do not thin the paste too much for lining paper and keep out alum, but in order to increase its adhesiveness, add a few ounces of Venice turpentine or Canada balsam to one gallon of paste, while hot. This paste, without the turpentine or balsam, will also answer for strong or heavy paper, that may be put over the lining, but for delicate papers we should suggest a paste made from wheat starch, which must be made by pouring boiling water under continued agitation on the starch until the paste assumes the appearance and consistency of lard. Another important point worthy of mentioning is that while hanging paper no draught should be allowed in the room or hall until the paper on every part of the wall or ceiling is apparently dry. Draught will dry the surface of the paper very rapidly, while the ground is still wet and cannot resist the contraction on the surface, which causes the paper to loosen in some spot and shortly after the balance follows.

— 422 —

Painting a Hot Water Tank of Iron in Imitation of Copper.

We haven't had much experience along this line, but would say that two coats of paint, composed of a first-class baking varnish and pigment, each coat baked on the iron by heat, would be fairly serviceable. If the color is to be a mere approach to copper, a mixture of a bright red with yellow and black, ground in and thinned with high grade baking varnish would serve the purpose. Or a good copper bronze, such as is used on steam radiators for pipes, mixed with such a varnish as described, might be even better. In this case, when the first coat has been baked on by the heat generated from the hot water in the tank, a second coat, before it has fully set, could be dry bronzed to enhance the brightness of the job. Still another, but more troublesome plan, is to take the solution of any salt of copper, such as blue stone (blue vitriol) for instance, and place in this pieces of scrap iron, which precipitates the metallic copper. This is collected on a filter, dried and mixed with a high grade baking varnish, and applied as suggested in the other methods.

— 423 —

Preparation to Keep Sliding Windows and Shutters from Screeching.

Make a lubricating soap by melting together three parts, by weight, of tallow, six parts, by weight, of palm oil, and three parts, by weight, of a 15 deg. solution of carbonate of soda. Apply to the parts that create the friction, be it the edges of windows or shutters or the sash ropes.

— 424 —

Flat Brick Red.

We should advise you to buy your flat brick red from a reputable manufacturer, and thin it as per directions, when you will find that you have a good, flat job, well bound. If, however, you wish to mix the color yourself, would advise you to mix a good Venetian red in oil with yellow ocher in oil to produce the proper shade, then mix some dry bolted whiting in brown japan to a paste and add five pounds of this latter to every ten pounds of the former mixture, and thin the whole with turpentine to the consistency of a thin varnish.

Test it for binding over any old painted surface, and if not strong enough, add a few tablespoonsful of spar varnish.

But if the bricks have not been painted before, you must give two coats of oil paint before applying the flat brick red. We do not approve of using varnish alone as a binder for flat brick colors, and would say the less varnish is introduced the better for wear and durability. It should consist of pigment, linseed oil, japan and turpentine only and varnish should be added in very small doses only, when required as an additional binder. As in everything else, the ground work is the chief feature here, for if the suction of the bricks is not thoroughly stopped, the flat coat will soon go to pieces.

— 425 —

Gold Bronze in Place of Gold Leaf on Wagon Work.

Inquiry was made in regard to gold bronze used for striping and ornamenting wagons that appeared to have stood as well as gold leaf.

The gold bronze on the wagons you mention may derive its durability from being pure gold bronze powder, which is made by grinding leaf gold with pure honey until the leaves are broken up and the mineral is finely divided. Then the mixture is removed from the stone slab with a spatula and placed in a porcelain dish containing clear water, which dissolves the honey and sets the powdered gold free. Let the gold settle and pour off the water, then add fresh water, repeating the operation until all the honey is washed out; collect the gold on filtering paper and dry for use.

This, of course, is a tedious process, and there are some very good gold bronzes to be had that will stand for years, the quality depending much upon the price paid. If bought under a guarantee from responsible parties, good material can be procured. We have had pretty good results on exposed work with No. 6000 rich gold bronze powder, using best durable coach body varnish and pure turpentine as medium for striping and applying a coat extra pale coach varnish over it. In certain localities this has stood well for over three years; in other less favored exposures, eighteen months and over.

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Bronzing Picture Moldings.

So far as we know, picture moldings formerly were bronzed by using a special varnish, from which all the acid features that might attack the bronze had been removed by treatment with caustic soda. But at the present time they use lacquers in imitation of bronze or where they still use gold or aluminum bronze they use a binder identical with or similar to the banana liquid. This liquid is a solution of celluloid in amylacetate, and if you get the pure article you can depend upon its standing the weather very well and that it will not tarnish good bronze powder. Whether it will stand water we cannot say, but we rather think it will do so, for a time at least.

Brass lacquer of the proper sort, with spirit of wine as the medium, may be applied over gold bronze, but not for exterior work.

— 427 —

How Gum Shellac May Be Dissolved in Water.

In a water bath dissolve two ounces of sal soda or one ounce powdered borax in one gallon of water, and when the soda or borax has dissolved and the water is boiling, put in your gum shellac, one pound, cover the kettle, stir occasionally until the gum is thoroughly dissolved. Sometimes it is necessary to use a larger portion of soda or borax to effect thorough solution. When the gum is dissolving it will first rise to the top in the form of a scum, but finally drops to the bottom again. The solution is complete when all the flakes or lumps have disappeared. It is best to have a larger and a smaller kettle set in one another, similar to those used in melting glue.

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Hard Oil Finish Turning White and Perishing.

Yellow pine casings and white pine doors were given a coat of sublac in place of filler, and two coats of hard oil. The owner bought the materials from a hardware house. Both sublac and hard oil were thinned with turpentine. A few months later the finish scaled, powdered and turned white and could be readily removed by rubbing with the finger.

If the sublac and hard oil were too stout to work properly, thinning with turpentine was the correct method, but you may have overdone it and cut all the life out of the varnishes. Still, that does not account for the turning white of the job, nor for its early perishing on interior work, which we assume it to have been.

The hard oil finish certainly must have been of very inferior quality, most likely pure rosin varnish with but little oil for a binder. In that case, even if you had not reduced it with turpentine, it would not have lasted much longer. To remedy the defect, the hard oil and sublac must be removed clean to the wood by either sandpapering or the use of ammonia, and the bare wood given a coat of shellac varnish for the yellow pine and either shellac or liquid filler for the white pine doors, preferably shellac varnish for both casings and doors, to be followed by two coats of hard gum inside varnish or the very best hard oil. It will be of no use to put varnish on top of the perishing coats, such as you have described.

— 429 —

Painting a Storeroom Display Table in White.

The display table in a clothing store was to be painted white. The painter used white lead thinned with equal parts boiled oil and turpentine, but the paint never dried hard and had to be removed. The store was cold, so the table was taken out in the open air, yet failed to dry hard.

If the table was in the raw wood, a coat of shellac varnish should have been given to keep the sap in. On this a first coat of pure white lead thinned one part raw oil and three parts turps, to which some good pale japan should be added as a hardener. Next a coat of pure white lead in oil, thinned with turps only and a small portion of pale japan; this coat, when dry, should be smoothly sandpapered and dusted. For a finishing coat, if a good, smooth white job is desired, zinc white ground in damar varnish, reduced to brushing consistency with a pale hard gum varnish and a little turpentine, should be applied, which, when hard, may be mossed or haired down with pumice and water to a dull finish.

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How to Apply Luminous Paint to Glass.

Some luminous paints are ground in and mixed with copal varnish; some with heavy bodied linseed oil; others with melted paraffine wax or japan wax and olive oil, and last, but not least, with silicate of soda. Your sense of smell will probably enable you to determine what is required for thinning. For use on glass, however, no other medium but wax will answer, and do not forget that in order to be luminous the paint must be exposed to sunlight for a certain length of time, or at least to very strong light. It is too much trouble for the painter to prepare such paints, as he has neither the apparatus nor the required material at hand, or within easy reach. To prove this, we shall give a few formulas for their preparation: Heat over a Bunsen burner for fifteen minutes a quantity of strontium thiosulphate, and after that for five minutes over a blast lamp. Or heat parts of strontium carbonate and lac sulphuris gently for five minutes, then strongly for twenty-five minutes over a Bunsen burner, and finally for five minutes over a blast lamp. These two will yield a greenish light when mixed with pure melted paraffine wax and applied to glass, but must be exposed to sunlight at least thirty minutes.

To obtain a bluish light, precipitate a strong aqua solution of strontium chloride with sulphuric acid; dry the precipitate, and heat it to redness for some time in a current of hydrogen, then over a Bunsen lamp for ten minutes and over a blast lamp for twenty minutes.

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What Is Hydraulic Lime?

Hydraulic lime is a species of lime that hardens under water or which can be used in making hydraulic cement. Portland and Roman cements as made in Europe are both hydraulic, and the

Rosendale cement manufactured in the United States must also be classed in the same category. If limestone is ground in water, then dried and calcined at high heat, the resulting material is hydraulic lime, because it will harden, when mixed with water and also under water. Calcined chalk will also answer the purpose to a certain extent, but will not become quite as hard as calcined limestone.

— 432 —

Lithopone—Its Value and Uses.

Lithopone, or, as many term it, lithophone, is a sulphide of zinc white, similar to Charlton white, Griffith patent zinc white, and is imported from Continental Europe under the brands green seal, red seal, blue seal and yellow seal, each of these having a different body and value, but all being of similar composition. The green seal brand is generally the best quality and is composed of one part by weight of zinc sulphide and two parts by weight of barytes, while the red seal brand consists usually of one part zinc sulphide and three parts barytes, the yellow seal and blue seal varieties contain a still greater percentage of barytes, and in consequence are very deficient in body and color.

Well made green seal lithopone approaches the body of the best French zinc very closely, and in certain classes of work it is far preferable.

At any rate, it will distance the ordinary grades of American zinc white, because it does not require as large a portion of thinners and works much more freely.

It is a first-class white for interior work, as it is unaffected by sulphur gases and does not yellow off when properly thinned. The only objection to its use by painters is that it will not stand exposure to the rays of the sun, because under certain conditions it will blacken before the paint becomes dry and hard. If oils or driers containing lead or copper salts are used with lithopone whites they will surely turn gray or black in strong light, nor can these whites be tinted with colors that have a lead or copper base, while with all other colors they are unchangeable. Within the last few years numerous factories have been started in this country that manufacture these zinc sulphide whites under different names and with good success, the goods being used to replace white lead and zinc whites in many large industries.

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What Is Silica and for What Is It Used?

Quartz is the purest form of silica (oxide of silicon) and occurs generally in granite rocks. It is ground fine in water and dried. The finest grades are marketed as floated silica or silex, and are much in demand for making wood fillers. The material being unaffected by sulphur gases, acids or alkalies, has been used to some extent in paints and is still used by some paint manufacturers in their so-called white lead in place of the heavier barytes. We do not advocate its use in paint because we consider it a very brittle mineral, but as a wood filler it has no equal when properly prepared, especially in point of fineness and purity. The material is a difficult one to hold in suspension in oil, and on settling cakes very hard.

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Best Size for Gilding on Glass.

Dissolve one-quarter ounce of gum arabic in one quart of boiling water. It must be rain water or soft river water, and while still warm filter into a clean bottle through blotting paper or several thicknesses of filtering paper, and when cold add one tablespoonful of pure grain alcohol or rectified whisky. Allow to stand a few days before using, and if well corked it will keep for years. To clean off surplus gold after backing up, wash off with clean water. Should the gold refuse to come off readily, add a little naphtha to the rinsing water.

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Best Method for Making Brick Walls Moisture or Water-Proof.

In the line of paint, we have had the best success by following this method: All dampness must be allowed to dry up as much as possible, then one coat of boiled linseed oil of good body is given and all joints and holes puttied up with pure linseed oil and whiting putty, colored with fine brick dust or Venetian red. This dry and hard, a coat of Venetian red, thinned with equal parts of boiled linseed oil and turpentine, is applied, and finally a third coat of red oxide or Venetian red, thinned with good raw linseed oil and some good oil drier, is applied as a finish. Or the color may be changed from a red to any desirable tint, using white lead as the base, tinting with oil color to suit.

The first coat should always be either all oil, or at least contain but little pigment, the second coat half flat and the last coat full gloss, and less than three coats will be insufficient. It is best to vary the color of the coats somewhat, so that laps or holidays may be readily noticed. In our opinion, such impregnation of the walls, though of higher cost, is superior to rough cement plastering.

— 436 —

Killing Knots on the Exterior of Frame Houses.

Wood alcohol white shellac was used to cover knots on the outside of frame houses, but after a year or so they came through. Sometimes the balance of the work is fine and glossy, the knots only looking dull and flat.

We do not think the trouble is caused by the wood alcohol shellac, as we have used pure grain alcohol shellac made by ourselves and used on interior, as well as exterior work, with similar results. Whenever there was only two coats of paint of light color applied, the knots would begin to show up inside of a year. Bleached or white shellac has but little strength in comparison with orange shellac or brown shellac, yet neither of these can be employed under light tints. White shellac varnish, too, is sometimes manipulated with water white rosin, which makes it still less resistant. The following method of neutralizing pine knots has been imparted to us by an old experienced painter, who claims to have had very good results from it:

Mix equal parts by measure of finely powdered red lead, white lead and bolted whiting with one-third each of raw linseed oil, coach japan and turps, strain and apply to the knots before priming.

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Best Backing for Gold Leaf on Glass.

Genuine asphaltum in oil, such as is sold in tubes for artists' use, is the very best material for backing up gold leaf on glass signs. The commercial asphaltum varnish will not answer. If the former cannot be readily obtained, mix lampblack, ground in japan with a high grade outside or coach varnish, first cutting the lampblack with some turpentine.

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Formula for Staining Oak Black.

If you desire to effect an imitation of ebony by staining oak, we will furnish you with the following: The wood is immersed for forty-eight hours in a hot, saturated solution of alum and then brushed over several times with a decoction of logwood made as follows: Boil one pound of best rasped logwood in ten pounds of water, filter through linen and with gentle heat evaporate so much of the liquid until it is reduced to five pounds. To this add twenty or thirty drops of a saturated solution of indigo, completely neutral. After applying this dye to the wood, rub the latter with a saturated and filtered solution of verdigris in hot, concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. It is asserted that when oak is thus treated it makes a very handsome and close imitation of ebony.

While this method of ebonizing oak is very durable and effective, because deeply penetrating, it is also time robbing and expensive in the end, and we believe that cheap work is done by simply staining the wood with aniline black that is soluble in oil and naphtha, and filling the same with a black filler. When the surface is thus smoothed a coat of flat ivory black is applied, then varnished and polished. In some cases a black lacquer is employed, of which two or three coats are given, and then the varnish for polishing. So-called flat black lacquers that dry almost as quickly as shellac varnish are in the market, and recommended for this very purpose.

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Paint for Hot Steam Pipes and Radiators.

Radiator paints are usually made very similar to baking enamels and consist of pigments and fatty varnishes that bake on the metal by the aid of the heat in the pipes. To suit well for the work the pigments must be ground in varnish to the utmost degree of fineness and thinned with a special varnish to proper consistency for free application. If the architect objects to linseed oil, he might equally object to painting the radiators at all, unless he specified that the same be lacquered or done in dry bronze. Even in that case a binder

is required to hold the bronze on to the metal, though it would not mean such a heavy coating as in the case of solid painting.

In mixing paints for steam radiators do not use oil colors, nor add linseed or any other oil, raw or boiled, but use colors ground for coach work, and thin with good, free working baking varnish, so that the paint will no more than just cover. In this way you will have no blistering, and the gloss will be retained. Use a bright red of good bulk, ground in varnish, for your hot steam pipes, and thin to the fullest extent with a good pale baking varnish, and the gloss will be more permanent.

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Black Ash Stain in Water or Spirit.

Boil three pounds extract of logwood, one pound concentrated lye and one gallon of water until all is dissolved, then strain. May be applied either hot or cold. If not dark enough, when dry, go over the work with a solution of strong vinegar and iron.

For quick work, dissolve extract of logwood in wood alcohol to the desired strength, strain and apply. To intensify the stain, go over the work with a tincture of muriate of iron.

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Repainting a Ceiling in Water Color.

A church was decorated nearly fifty years ago in flat paint, imitations of plaster moldings, etc., quite dark tints. Light tints now being wanted, the question was asked which was the best method to pursue: To give a coat of flat white and tint on that, or to give a coat of glue, whiting and alum size and tint on that. One coat will not cover the old work, especially after all the cracks are cut out and plastered up.

We fully agree with you on the last paragraph, and are afraid that you will not get along even with a coat of flat white, especially if you have water stains to cover over. Would advise you to size all the new plaster in the cut-out cracks and apply one coat of white lead tinted to the color of the lightest tint you intend to apply in the finish, and thin with turpentine only to make it dry flat. This will be safer than the coat of glue, whiting and alum, because the ceiling in this case is not a new one, where the priming can get a hold on the plaster. Aside from the risk of peeling, you will have better covering from the tinted white lead coat.

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Glazing Aluminum Leaf to Obtain a Golden Effect.

Raw sienna is not transparent enough for a glaze on leaf, and Dutch pink is out of the question altogether. Procure some high grade French yellow lake, ground in varnish, and thin same as you would French carmine for glazing with as little turpentine and as much pale coach varnish as possible, and you will get the desired effect.

We recommend French yellow lake especially, because we know it to be more permanent and safer than gamboge, turmeric or dragon's blood, although a mixture of the last two would give a richer effect in the outset.

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Hardening Glue and Quickening the Drying of Plaster Paris.

Mix some finely powdered, brick dust with your glue, and you will find it harden quicker in the ratio of proportion of dust added.

Mix your plaster with water in which you have previously dissolved gum arabic in the proportion of one ounce of gum to each pint of water.

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Putty for Glazing Sash of Cast Iron.

Pure linseed oil and whiting putty, mixed with some dry white lead and a little japan, thoroughly kneaded, is the best material. Or, if you have any oil paint skins about the shop, run them through a paint mill until fairly fine, then mix with bolted whiting fairly stiff and pound with a mallet or knead very thoroughly. But before putting in your glass prime the sash with good paint, half flat.

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Deadening and Perishing of Oil in Exposed Places.

In the summer, the outside of a frame house that had previously been painted a salmon color, was painted pea green, using white lead tinted with Imperial green in oil, thinned with boiled oil and turpentine. Four months later the paint could be rubbed off with the hand, except in places where the sun did not strike it.

We believe that, in the first place, the exposed portions of the old painted surface were more dry than were those where the sun did not strike and in consequence absorbed more of the oil from your fresh paint. In the second place, you should not have used any turpentine in repainting old work in summer, as the liquid drier, which you have no doubt used in the paint, has enough volatile oil, such as turps or benzine, in its makeup, and, lastly, your boiled oil may not have been of the best quality. We should advise you to examine conditions of old painted surfaces very critically in the future before beginning repainting, and call your patron's attention to the same when you are not certain of your ability to produce good wearing effects with the specified number of coats. Also to let boiled oil alone, unless you are certain of procuring kettle boiled linseed oil of good body and unquestioned purity. Use pure raw linseed oil instead.

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To Keep Dry Bronze from Sticking to Glass and Japanned Tin.

Trouble was experienced from the sticking of aluminum bronze on glass and japanned tin signs. The letters were painted with a liquid made from spar varnish, japan and white lead. When the size became tacky the bronze was dusted on, but the surplus bronze was difficult to clean off.

See that your glass and japanned tin is thoroughly dry, and dust all over the surface before applying the size some finely powdered talc or chalk, which may be dusted off when the bronze on letters or stripes has become adhesive, and in dusting the bronze or gold will come off with the talc or chalk.

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Pure White Lead Paint Scaling on Yellow or Southern Pine.

The following test was made with pure white lead on panels of hard pine that was very sappy. One piece was painted two coats, the lead being thinned with raw oil; second piece with nine parts raw oil and one part turps, raw oil only being used in the third coat; a third piece was the same as the second, except that coal oil was substituted for turpentine. The panels were laid on a tin roof for some time and afterward nailed on the south side of a shed. The second and third tests scaled badly before the first began to scale.

We rather think that the term scaling is misapplied here and that the paints peeled, or, in other words, were thrown off by the drawing of the sap out of the wood by the heat of the sun. In painting yellow pine the first coat of paint should be made very thin and moderate use of turpentine is not objectionable, but rather beneficial, inasmuch as the paint has a better opportunity to penetrate.

But in no case should coal oil be used, as it prevents the hardening of the priming coat and, incidentally, subsequent coats. The priming or first coat on yellow pine should be given plenty of time to dry thoroughly and hard before the next coat is put on.

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How to Prepare Paper Hangers' Paste That Will Not Liquefy.

The best method is to take sifted wheat flour, and beat it up in cold water to a stiff batter. When all the lumps are beaten out of it, add enough cold water to make it similar to pudding batter. Then while stirring pour in a little hot water first, and, after a minute or so, pour in the hot water faster, and stir until the paste swells and thickens and becomes darker. Pour a little cold water on top to keep from skimming over while cooling. Four pounds of flour should make about six to seven quarts of paste.

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Pine Oil as a Substitute for Linseed Oil in Roof Painting.

The question was asked whether pine oil mixed with fireproof mineral would make a good paint for roofs.

When you mention pine oil we are not certain whether you mean liquid pine tar or rosin oil. For shingle roofs either of these can be used for thinning metallic paste paints that are ground in linseed oil, but the use of rosin oil in any great portion will not give good wear, because when paint mixed with rosin oil is apparently dry it becomes soft again and alternately hardens and becomes soft and tacky, until it is destroyed by the action of the sun and rainstorms, powders and is finally washed off. If you do not guarantee the work, you can use about two-thirds rosin oil to one-third linseed oil for this work. As rosin oil is rather heavy in body, the paint may be cut with benzene.

If you have liquid pine tar in view, you cannot use it straight, but your metallic paste should be first thinned with a cheap lightning drier to proper consistency for brushing and then sufficient pine tar

added to produce a free working paint: We, however, do not assume any responsibility for the foregoing, only suggesting what may be done in the way of cheap roof painting, always believing that orthodox paint materials are cheapest in the end, no matter what first cost may be.

Where bright color is not required, you can make a cheap and fairly durable roof paint by mixing in the cold way 10 gallons each of coal tar, pine tar and benzine, with 10 pounds well-sifted, air-slaked lime and the necessary mineral red or brown pigment.

— 450 —

Paint Peeling Off to the Plaster on the Wall of a Kitchen.

The old kalsomine was washed from the walls of a kitchen by the owner, not particularly clean, but fairly well. The priming was probably too flat; then one coat of size was given to insure gloss; the second and last coat was probably too oily. The paint was mixed from best lead and oil, but it peeled off in spots.

From your description of the method pursued in painting that wall we should say that as the paint peeled off in spots clean down to the plaster it is evident that all of the old kalsomine was not removed; also that your priming coat was not oily enough and not adhesive to a sufficient degree to resist contraction of the size and that the size shrunk under the oily finishing coat, pulling away the flat priming in such spots where the loose kalsomine still remained on the wall or where there may have been some greasy spots on the walls. You could have ascertained this if you had closely examined the shreds of paint that peeled off on the under side. The priming for a wall, new or old, that has never been painted in oil before should always carry enough oil to allow for suction, and the size should not be too strong.

Many painters, in painting new walls, use a cheap varnish, commonly known as wall sizing or suction varnish, but we prefer to give the bare wall a priming coat of pure white lead, using not more than six pounds to seven pounds of raw linseed oil and one pint of turpentine, and brushing this in well. When this is dry, a coat of glue size should be given, which will answer for two coats of paint. On top of this give as many coats as are required for the finish desired. We would not advocate the use of the mixture you speak of.

— 451 —

How to Obtain a Clear, Burnished Gold Letter on Glass.

Whatever dust may come with a book of gold will not show between the letter and the glass. In the first place, good work cannot be done on poor glass, for upon the purity of the glass depends the greater part of the brilliancy of the work. Clean the glass perfectly with whiting and water and polish the working side with finest tissue paper. Apply the size freely with a clean camel's hair spalter and with the tip throw on your leaf, then set your glass up edgewise, if you have had it in horizontal position. When dry, take refined cotton and rub the leaf briskly until luster is obtained.

Do not mind if you rub most of the gold away, the luster is there. Then apply a second coat of leaf, as you did the first, and when dry go over it again with cotton, this time lightly, and wash it with sizing repeatedly to obtain a spotless surface. After the design has been pointed out, wash off the surplus gold with water until nothing remains on the glass but the gilded letters or design. Always have the glass in a vertical position to permit the water to drain off thoroughly.

— 452 —

Sweating of Hard Oil Finish on Interior Woodwork.

A new house in the South had the interior woodwork of Georgia pine finished with hard oil. The walls were plastered, the work being finished two weeks before the varnishing was done, and the plaster apparently being dry. The hearth was cemented and very damp. While the varnish was applied the weather was fine and the wood dried nicely, but a few days later the weather was warm and rainy and the atmosphere in the closed up house was very damp. The varnish began to sweat so badly that on the doors, window casings and sills the drops stood out, while on the mantels it came down in streaks.

The trouble in this case is caused by moisture and lack of ventilation, and not by any fault in the varnish. There was a combination of conditions, every one of which tended to assist in bringing about the so-called "sweating" of the hard oil finish. Though the plaster may have appeared to be dry, it was not so by any means, but only hard, and no doubt still contained some moisture, which was given off to the atmosphere in the rooms. The woodwork was probably not well seasoned and the rooms being closed the moisture settled upon the varnished surface, where it could be most plainly seen. The only remedy in such a case is the heating of the rooms and admission of air.

— 453 —

Oil Stain for Birch in Imitation of Mahogany, and Black Stain for Oak.

To give a rich mahogany color to birch wood and show up the grain well, mix three pounds of rose pink in oil and one pound of a deep burnt sienna in oil, with one quart best brown japan, one quart of boiled linseed oil and two or three quarts of turpentine. If not dark enough, add one pint best turpentine, asphaltum varnish, and if not rich enough add some rich red lake to the mixture in sufficient quantity to give the desired effect. Have the stain as thin as possible so as to penetrate deeply into the wood. To stain oak very dark, mix three pounds of burnt umber in oil and one pound of a good drop black in oil with one quart of best brown japan, one quart of boiled oil and one gallon or more of turpentine, and for staining oak black, mix three pounds of a good drop black in oil that is not blued with a similar quantity of best brown japan, boiled oil and turpentine, as is described for the previous formula.

— 454 —

Best Way to Clean a Stippling Brush.

Wash the brush in the usual way in benzine or gasoline, dipping it into the fluid bristles down, repeating this until the bristles appear clean, then take the end of the handle between the palm of both hands, twirling the brush rapidly so as to get out all the liquid possible. Do not wipe off the brush on the edge of the pot, as many do, as this method ruins the shape of the brush. After the brush has been cleaned in benzine or gasoline, dissolve a piece of washing soda the size of a walnut in a quart of warm (not hot) water, and repeat the operation, taking care to get a little water on the back and handle of brush. When the bristles appear thoroughly clean, wipe off the back and handle with a dry cloth, but do not touch the bristles, and set the brush in the sun or near the fire to dry. Wiping softens the bristles and so does the use of soap or soapsuds.

— 455 —

What Is Stucco Composed of?

The best stucco is said to be composed of plaster of paris (calcined gypsum) that has been steeped in a saturated solution of alum and recalcined, then reduced to a powder. For use as a stucco, it is mixed with water, same as the ordinary plaster of paris.

— 456 —

A Simple Method for the Detection of Mineral Oil in Linseed Oil.

Keep in your shop a strip of clear window glass, say about 3 by 8 inches, coated on one side with several coats of lamp-black; also keep in a well-stoppered bottle a sample of raw linseed oil that is unquestionably pure. Keep the oil in a dark place, so as to hold its original color; otherwise it will bleach from the effect of strong light. Place a few drops of the suspected oil on the unpainted side of the glass, and alongside of that a few drops of the pure oil, and if the suspected article contains only 5 per cent. of mineral oil it will be plainly noted by the bluish cast (usually termed bloom) of the specimen. Your suspected oil may contain a good portion of cottonseed oil, which at present is somewhat lower in price than linseed. To test for the presence of cottonseed oil, make a freezing mixture of ice and salt, and insert into this a small bottle or test tube containing some of the suspected oil. Linseed oil freezes only at a temperature of 18 deg. F. below zero, while cottonseed oil freezes at 28 deg. above zero. When the suspected article, after remaining in the freezing mixture for thirty minutes, assumes butterlike consistency it is either all or nearly all cottonseed oil, if only somewhat coagulated the percentage of cottonseed oil is probably one-third or one-half, but if the oil is unaffected and merely becomes cloudy it may be pure linseed oil containing a very small percentage of moisture. Fish oil also freezes very readily at 30 deg. F. above zero, but its presence is easily detected by its odor. At all events, you should view with suspicion any linseed oil that is offered you below current market rates.

— 457 —

Gold Bronze for Old Picture Frames that Will Not Tarnish.

The question was asked why the following method of refinishing old picture frames in gold did not prove satisfactory. The old gilding was washed with ammonia water, and after they were dry, a coat of japan gold size was applied. When this had a good tack, dry bronze was applied, and a good burnish obtained, but in a short time the gilding tarnished and the luster was very dull.

The reason for tarnishing and loss of luster in your bronze may be due to two causes—either your bronze is not of good quality or your gold size japan reacted on the alloy.

Gold size japan contains, as a rule, a good portion of lead oxide, which may have had a bad effect on your bronze or your bronze was not of good quality.

We would suggest that you employ the so-called French gold bronze that is made from gold leaf and do your bronzing in the wet state, using as a medium the japan lacquer, known to the trade under the name of banana oil, a clear liquid of quick drying and binding properties, which does not affect the color or luster of the bronze, but rather protects the same.

— 458 —

How to Make a First-Class Job in Painting a Brick Wall.

If the walls are to be painted in red, prime or first coat them with a good Venetian red that is ground in linseed oil, thinned with raw linseed oil and a little good oil drier. Rub this prime in well and after drying putty up the joints with a good linseed oil and whitening putty that has been colored with Venetian red. The priming coat should not weigh over ten pounds to the United States gallon.

For second coat, mix one-fourth pure white lead in oil with three-fourths Venetian red in oil, and thin with two parts raw linseed oil and one part of turpentine, adding a good oil drier as required. Brush this coat out well and uniformly, and it will give body to the job. For the third and last coat, mix a first-class Venetian red in oil with pure boiled linseed oil of good body and a little good oil drier, flowing it on, but in such a way that it will not run. This is for a gloss finish. For a flat brick red effect prime and putty up in similar manner, and apply the second coat with three-fourths oil and one-fourth turps, while for the finish we should advise you to use flat brick red paste, thinning with turpentine. If you cannot obtain a good flat brick red, prepare it by thinning stiff ground Venetian red with best brown japan and turpentine, making the paint very thin. Should the paint be a little glossy, it will become flat enough after a few weeks.

If other color than red, as, for instance, buff or greenish tints, are desired, use pure white lead, thinned with raw linseed oil and a little drier for priming, holding it thin, say about ten pounds keg lead to three quarts of oil, and when dry putty up. For second coat use ten pounds keg lead to three pints raw oil and one pint turpentine, adding a little drier. Tints on brick walls are usually held in gloss finish, therefore we should recommend the use of three parts keg lead and

one part zinc white in oil, adding the necessary tinting colors and thinning with raw linseed oil and the required drier for the finishing coat. Less than three coats will not make a good job, and in order to have the paint wear well would suggest that you do not begin to paint until there has been at least one week of dry weather, so that the moisture is fairly well out of the bricks; otherwise you run the risk of having your paint scaling.

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Durability of Shellac Varnish as First Coat Under Oil Paint or Finishing Varnish on Exterior Work.

Good grain alcohol shellac varnish can be classed as indispensable for a first coating for hard pine, and you need not trouble yourself as to its standing under subsequent coats of paint or varnish. Good shellac varnish stands exposure to the weather very well by itself, excepting in the presence of moisture, so that when it is protected by one or more coats of oil paint or oil varnish it is a pretty safe first coater for hard pine and other resinous woods, acting as a sealer to keep in the sap to a great extent. Of course, no one would think of applying more than one coat of the expensive shellac varnish to exterior woodwork or to use the same for finishing. That it is not used more extensively is no doubt due to its cost and not because of the fear of its not standing exposure to the ordinary conditions of weather.

— 460 —

Vehicle for Aluminum Bronze Paint.

The so-called "banana oil" is not the only medium for mixing with aluminum bronze, but it is about the best medium for exterior bronzing, because, in spite of its quick drying, it retains its elasticity under severe exposure and has no discoloring effect upon the bronze. A good hard gum varnish that is fairly pale, reduced with spirits of turpentine to good flowing consistency, will also serve as a good medium for aluminum bronze for exposed work, especially for ornamental sign work. For inside bronzing, where banana oil is undesirable because of its odor, any good copal varnish, reduced with turpentine or benzine, will serve as bronzing liquid, providing it does not diminish the luster of the bronze perceptibly.

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Repainting Canoes from Which the Paint Is Abrased.

The best way to obtain good results is to remove the paint still remaining clean to the wood, either by burning off or by applying the following: Slake 15 pounds of quick stone lime in water, and when fully slaked add 5 pounds of American pearlash, making the mixture of the consistency of semi-paste paint. Lay this fairly thick on the paint, let it remain until the old paint is softened clean down to the wood and scrape off, then wash with water and vinegar, equal parts, and allow the surface to dry thoroughly before attempting to repaint. Sandpaper the places where the grain of the wood

may have been raised by the action of the lime and pearlash mixture.

In repainting do not hold your priming or first coat too oily, but temper it to suit the nature of the wood, or, best, use equal parts raw linseed oil and turpentine, and if any puttying is to be done, do it after the priming has dried and use good linseed oil, lead and whiting putty. As less than three coats will not make a good job, would suggest that the second coat be held so as to dry with no higher than eggshell gloss, and if high grade of work is desired, regardless of cost, would recommend the adding of a first-class spar varnish to the oil paint for third coat. Remember that too liberal a dose of oil in paint for boats is liable to cause peeling or blistering, and mix your paint for the various coats accordingly.

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Silvering Glass Without Heat Again.

In using the method given in No. 391, it was found that in putting the glass in, a black deposit is formed which is easily rubbed off. Would an excess of ammonia cause this? In mixing, the ammonia was not added drop by drop, but a little poured in at a time.

We do not think that it is necessary to add the ammonia drop by drop, but the silver solution and ammonia must be mixed proportionately, a little at a time, until the silver solution is exhausted, when the mixture must be filtered. It may be that the pan was not well enough coated or that the nitrate of silver was not pure, and as the rochelle salts act as the binder the cause of the silver rubbing off so readily may be found in a lack of strength in the salt solution. Try again, following the instructions carefully, using pure nitrate of silver and the strongest commercial ammonia and be careful to have the tin pan well coated, so that the silvering mixture cannot possibly come into contact with the tin.

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Size for Aluminum Bronze.

For interior work you can reduce any good copal or coach varnish with pure turps or benzine, using one gill of either of these solvents to one-half pint of varnish. Apply the size to the object, and when it has set with a fair tack dust on your dry bronze, and in a short time rub off the excess of powder with a pad of cotton.

This will produce good luster, provided you use bronze of high grade. The same liquid may be employed for wet bronzing, but it should be more dilute for such purpose, say equal parts varnish and solvent.

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Painting the Interior of an Iron Roof with Cork Paint.

The specifications called for one coat of paint, then a layer of cork and a final coat of paint.

We have very little experience along this line, and can only make suggestions as they occur to us. The cork must, of necessity, be in a fairly fine powder, the first coat of paint must be stout and oily, so that enough of the cork will adhere to make a uniform

coating. We should think it best to coat a small space at a time, spread a cloth under this space to catch the excess of cork when it is thrown on the wet paint, and also to catch the surplus that is brushed off when the paint has dried, so that it will not interfere with the second coat of paint. The surest way to have the work uniform would be to use a good priming coat of red lead, and follow this with a mineral paint, into which the maximum quantity of pulverized cork has been introduced, brushing it on heavy. This would cost considerably less and save a great deal of time and annoyance, and serve the purpose equally as well.

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Proper Proportions of White Lead and Zinc to Insure Good Wear on Exterior Surface.

The opinions of experts vary in this respect, but as the variation of the proportions by those of longest experience and highest reputation among the fraternity are limited between 75 per cent. white lead and 25 per cent. zinc white and 85 per cent. white lead and 15 per cent. zinc white, we may say that a safe proportion in localities named by you would be 80 per cent. pure white lead in oil and 20 per cent. zinc white in oil; while in salt atmosphere, as, for instance, along the seaboard, a combination of two-thirds white lead in oil by weight and one-third zinc white in oil by weight, for all but the priming coat, would be proper, the priming coat to be pure white lead in oil only. This, of course, refers to jobs in pure white or delicate tints only. For strong tints, where such a color as yellow ocher, for instance, is used in large proportions, it is unwise to use zinc white at all, because ocher is really a brittle material that will correct any chalking tendency the white lead may have. On the other hand, take a tint like Colonial yellow, that is made from white lead and chrome yellow, 10 to 15 per cent. of zinc white will not be out of proportion. The painter should make his combinations of lead and zinc to suit the tinting colors required to produce the stronger or dark tints, as a great deal really depends upon their properties. It goes without saying, however, that in the chalking of white lead paint and in the cracking or peeling of zinc white paint, the thinners and driers employed exercise quite an important part.

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How to Prepare and Apply a Good Flat Black for Grille Work.

Such a flat black is best made by thinning a good drop black in japan, such as is used by coach painters, with turpentine to a consistency almost as thin as liquid drier and adding enough of a good coach varnish to give the required binder, but not enough to produce even a faint gloss on drying. As such a paint dries very quickly, proper thinning and required quantity of varnish may be readily ascertained by applying a little of the mixture to a piece of hoop iron or black sheet iron, and on drying it can be tested by rubbing over it with the point of the finger.

For inside work, part or all benzine may be substituted for turpentine in thinning the black. A soft, flat brush of suitable size should be used for applying the paint and the brush dipped into the paint lightly only to prevent running over the edges and clogging in the corners. Whether one or two coats should be applied on inside work depends on the nature of the job and the price paid, but real good work cannot be done with one coat.

For handrails and exposed iron work that is to be finished flat, we would recommend a first coat of drop black in oil or varnish, that will dry hard with good gloss and finish with a flat black as above, but use no benzine for thinning.

The idea of finishing in flat black is to hide any imperfections or tool marks in the iron that would show up in gloss finish.

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Stamp Ink for Rubber Stamps.

The following recipes have been published several years ago in the Scientific American, and while we have not tried them, we think the inks made on these lines very good. It will not cost you much to make the experiment.

Blue Rubber Stamp Ink.—Mix 3 parts by weight of aniline blue, water soluble 1B with 10 parts by weight of distilled water and triturate in a mortar, and add gradually 70 parts by weight of glycerine. When a solution is effected, add 10 parts alcohol and 10 parts pyroligneous acid, also by weight. Stir well and bottle.

Other colors can be made by substituting for the blue the following:

For	Parts by weight.
Red: Methyl violet, 3B.....	3
Scarlet: Diamond fuchsin, I.....	2
Green: Methyl green, yellowish.....	4
Brown: Vesuvian B.....	5
Black: Nigrosin W (blue black).....	4

For a bright red, three parts eosine BBN are used, but in this case the pyroligneous acid must be omitted or else the color will be destroyed. All other aniline colors, when used for stamping ink, must be acidulated.

For stamping linen or cotton in black, dissolve one ounce of asphaltum in four ounces of turpentine and add enough calcined lampblack to make the ink of the right consistency for printing with type.

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Unshrinkable Molding Cement.

A formula was asked for a cement for molding small objects that require delicately fine lines of cast, such as engraved plates. It must be unshrinkable, harden quickly and resist pressure of heat.

For this purpose there is none better than Jannin's cement, so named after the patentee, a resident of France. It is simply a mixture of oxide of lead and glycerine, in suitable proportions to meet requirements. The yellow oxide of lead, known as massicot, is said to be most suitable, although other metallic oxides may be mixed

with this in small quantities to suit the nature of the work in color. The quantity of massicot and glycerine required must be determined by the nature of the work and the consistency of the cement. The cement will set in a few minutes under the influence of gentle heat, and will then resist pressure and heat and will neither contract nor expand.

When set, the cement can be employed as a substitute for lithographic stones, and can replace them for many practical purposes. Will also serve for artistic reproductions, such as the facsimiles of terra cotta, whose color and sonorous quality it possesses.

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What Is Bole?

Bole is a pigment similar to clay, and occurs in white, gray, red, brown and yellow color. It is a silicate of alumina, and whatever color the mineral possesses is due to the presence of oxide of iron.

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Opinion as to the Cause of the Exterior of a Dwelling Checking and Peeling After Repainting.

The following detailed statement of the conditions was given by the painter of a house on which the paint failed: "The work referred to was repainting the exterior of a fine Colonial house, all wood. Have had nothing to do with first painting, when the house was built. First painting was light gray priming, applied October and November; second coat, light Colonial yellow, with trace of red, applied February and March; third coat about the same color, applied April and May of same year. The work was coated very heavily. From September 22 to November 12, two years later, I repainted the house. All of the old paint was thoroughly sandpapered and dusted, and the material used was English B. B. lead, raw American linseed oil and a drier of good reputation. For first coat, best yellow ocher in oil was used for tinting the lead, with a trifle of Van Dyke brown and enough turpentine added to produce an eggshell gloss. The finish was in old ivory tint, and very little coloring matter necessary to produce this, but in last coat I used in addition to the lead about 20 per cent. genuine Veille Montagne French zinc. When finished, the whole job showed up as fine as any I ever did, but in less than a year's time the paint began to check partly across the grain and partly with the grain of the wood, and three and one-half years later the work has all gone to pieces, checking clean through to the priming in dry places and peeling off to the wood where exposed to dampness. The blinds, which were also painted, have stood very well. These were first coated with American lead tinted dark lead color, shaded toward green. Second coat was yellow ocher and lampblack, toned up with a dark chrome green."

We cannot find any fault with your painting or the materials you have used, although the drier you name is a very strong one, and you may have added more to your paint than was necessary

for a job which, according to your statement, was in nowise hurried. We think that the disintegration of the paint is not so much due to the addition of zinc white on the final coat as to the heavy coats in the original painting of the house, when newly built, and it is just possible that if you had made a very close examination of the surface before repainting you might have discovered the fissures that showed up afterward in the shape of check marks or cracks. Not only that, but it may be that the material used in the first painting was of inferior quality and not a good foundation for repainting. We trust that some of our readers will give us the benefit of their experience on similar lines.

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How Decalcomania Transfer Ornaments Are Applied.

Coat over very thinly the gold back of the transfer with coach varnish, and you need not be particular whether you get the varnish on the paper outside of the figure or not. Lay the ornament or picture to one side until the varnish becomes quite tacky, then lay it on the desired place and rub gently with a moistened sponge until all the parts are flattened down. Allow this about one-half hour to dry, then wet the paper with a soft sponge and cold water until it lifts off easily, when the printed figure will be left perfect on the panel. With a soft rag dipped in turpentine, gently rub over the whole to remove the surplus varnish, and the work is complete.

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How to Dissolve Gum Shellac Properly.

Failure to dissolve white (bleached) shellac in grain alcohol shellac so that it remains in suspension may be due to inferiority of the gum or to lack of strength in the alcohol.

When the bleached shellac gum is pure and in good condition and the alcohol between 92 and 95 per cent., there should be no appreciable settling out of the gum. When we speak of 92 per cent. alcohol, we mean that the liquid must contain 92 per cent. absolute alcohol and 8 per cent. of water in one hundred parts by weight, or when 95 per cent. alcohol is mentioned, it means that one hundred parts by weight of the liquid should contain 95 per cent. absolute alcohol and 5 per cent. water. Spirit of less strength will not cut gum shellac properly, and alcohol absorbing moisture very freely must be kept tightly sealed up. When purchasing white or bleached shellac, it is best to buy it in twist form and not in the pulverized state. To keep these twists in good condition a keg should be half-filled with water and placed in a cool part of the shop and the twists of gum shellac placed on a crate above the water in the keg and the same covered with a cloth, and the water should be renewed from time to time. This method will keep the gum in good condition. If left in a perfectly dry place it becomes crumbly and useless, while when kept under water it tends to blacken and mold. To prepare the varnish inclose the gum shellac in a strong bag and beat with a hammer or iron pestle; sift out the fine particles and continue the operation until it is all pulverized; place the powder in a wide-mouth glass bottle or jar and pour over it the re-

quired quantity of 95 per cent. grain alcohol; close the bottle with a glass stopper and agitate by oft-repeated shaking. If the receptacle is first placed in moderately warm water and then in hot water, it will hasten the solution and produce a clearer varnish. The addition of Venice turpentine adds toughness to the varnish and permits it to flow more freely, but does not add drying properties. It is recommended that for white shellac varnish of medium body the following proportions be used: Two pounds bleached shellac, one-half pound clear Venice turpentine, 6 pounds 95 per cent. alcohol. White shellac varnish should be kept in glass only, as tin vessels tend to darken it. The reason for your complaint of the slow drying of the shellac varnish, that you purchase in ready for use form, must be looked for in the fact that commercial shellac varnish, even when grain alcohol shellac is asked for, is not made with that article, but with methylated spirit, and it stands to reason that manufacturers cannot supply the orthodox article at the price quoted. The Painters Magazine in the September, 1899, issue, gave a full and thorough description with illustrations in an article entitled: "How Shellac Is Manufactured," from which we will quote: Lac is a resinous incrustation formed on the bark, twigs and branches of various trees by an insect known to entomologists as the *Coccus Lacca*. It is found in most of the provinces of East India and in Bengal, Assam and the Central provinces; also in Siam, Ceylon and some of the islands of the Western Archipelago. The resin is gathered by the natives at various seasons and ground in stone mills in a rather primitive manner, by hand, then sifted so as to free it from barks, twigs, etc. Then the ground sticklac, so called, is taken to the washroom to free it from the lac dye, a beautiful permanent red color. When it has been washed, it is spread out under cover and permitted to dry and finally carefully selected according to color and melting quality into the particular grade of shellac which is to be manufactured. The ground lac is now packed into a cotton pipe or cotton bag, somewhat resembling a canvas fire hose pipe.

In the fire room this cotton bag is hung up about 18 inches above a charcoal fire, and twisted by sticks inserted at either end and operated in opposite directions by two natives. As the melted lac oozes through the meshes of the cloth pipe, it is scraped off and passed to an operator, who dexterously spreads it over an earthen jar filled with hot water. The lac is then rubbed down with a cloth to an even surface and stripped from the jar. The thick sheet of shellac is again heated before the fire on both sides; then stretched and pulled in all directions by hand, into a large sheet, then broken up and laid aside to season, preparatory to shipment. The labor of 250 persons is required to finish 20 cases in one day of 12 hours' work. Shellac is bleached by heating 10 parts of the orange shellac with 4 parts of soda in 120 parts water in a copper kettle, and when dissolved, the liquid is filtered through cloth into a wooden tub. Ten parts chloride of lime are mixed with a solution of 10 parts soda in 200 parts water, and filtered into the shellac and soda solution. When the two solutions have cooled off, a small portion of dilute hydrochloric acid is added, until some of the shellac separates; then it is permitted to rest for a few days and the shellac precipitated with hydrochloric acid.

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Method of Etching on Glass.

The liquid for etching on glass may be made by mixing three parts of sulphate of barium with one part of fluoride of ammonia, and adding sufficient sulphuric acid to decompose the ammonium, bringing the mixture to the consistency of rich milk. The mixture must be made in a lead pan or leaden vessel and should be kept in a bottle of lead or gutta percha.

Fluoric acid usually etches smooth, while other fluoric preparations yield a matt surface. The most beautiful ornamentations are produced when certain parts of the glass surfaces are rendered matt by the use of fluoride of ammonium, that has been slightly acidulated by means of acetic acid. The matt appearance is not always the same with different kinds of glass, but varies much in beauty according to the composition of the glass, lead glasses being most easily acted upon and furnishing a fine matt surface.

When it is desired to have the surface of the glass not altogether matt, but shining like ice, this may be attained in a simple manner by placing the glass plate in a perfectly horizontal position and covering it with fine groats. Then very dilute fluoric acid is poured upon it. The groats act as a shield and produce upon the glass raised points. grounds for etching may be prepared as follows:

White wax, 50 parts; gum mastic, 25 parts; asphaltum, 25 parts; melted together; or, white wax, 3 parts; black pitch, 1 part; rosin, 1 part; asphaltum, 4 parts, also melted together. With either of these grounds cover the glass surface, tracing the design upon it, and pour on your etching fluid. If the first operation does not etch deep enough repeat it until desired effect is obtained.

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To Reduce the Cost of Shellac.

Rosin is the least costly and best article for the adulteration of shellac. It is readily soluble in 95 per cent. wood alcohol, especially when done in a water bath. With bleached shellac.

W. W. or W. G. rosin is the best grade, for orange shellac F or G rosin will serve the purpose. If wanted to adulterate the gum shellac itself, the shellac and rosin are simply melted together, brought into desired shape and allowed to cool.

If desired to reduce the cost of shellac varnish it is best to dissolve the shellac and rosin separately and, allowing the rosin solution to settle, using the clear solution only to mix with the lac solution.

Wood alcohol shellac mixes readily with rosin and benzine liquid (called rosin varnish here in the East and gloss oil in the West), and many dealers sell such mixtures as shellac varnish.

It would be better, however, to make the experiment on a small scale first and note the drying as against the true wood alcohol shellac. If it dries too slow, you had better melt the rosin before dissolving it, or use hardened rosin. If it sets up too quickly, a small percentage, say, 5 per cent. of the quantity of rosin employed of gum, thus (gallipot, ink or crude turpentine) added, will slow it up.

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Cleaning of Painted Walls.

Plastered walls that have been painted can be cleaned satisfactorily, providing the paint has not begun to perish. In cleaning a painted wall it is best to have two men working together—one following the other. In this way there is not so much risk of spotting or streaking. A stretch of three or four feet is as much as should be done at a time. First dampen the wall with a sponge that has been saturated with clean water; follow this with soap suds, made from castile soap and warm water, applying same with a kalsomine brush, scrubbing lightly. When the dirt has been softened in this manner, scrub with a solution made by boiling the shavings of one pound of castile soap in one-half gallon of water, stirring in two pounds of fine bolted whiting, and allow to cool. Dip the brush into this mixture and scrub, taking care not to scrub harder than is required to remove the dirt. Sponge off immediately with clean, soft water and wipe down with a wet chamois that has been wrung out. Avoid using too much water but wring out sponge and chamois as often as possible, and change the water quite frequently. Always begin at the bottom and work up. Ceilings are cleansed in similar manner, and when the walls or ceilings are smoky a little household ammonia added to the soap-suds will add to their efficiency in removing the dirt.

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Process of Making Chipped Glass Signs.

The work is done best by means of the sand blast, which up to within a few years has been operated by air pressure, but in recent years a patented device throws the sand against the glass by a jet of steam, doing much cleaner work than the blast worked with fans, blowers or air compressors. In this device the stencils are made from toughened paper, rubber or metal, and are fastened to the glass with a cement or glue that is not injurious to the polish of the clear portions and is easily removed by soaking with warm water. When this machine is employed, the steam jet forces the sand against the uncovered portions of the glass, but before it strikes the glass a counter current of air drives back the steam, so that the sand is dry on action.

It is evident, however, that these machines are too costly for any one who does not follow the manufacture of chipped, frosted, embossed or split glass to any extent, and therefore we will consider the old-fashioned method of producing a similar effect by the use of hydrofluoric acid. In the first place, the glass to be chipped must be of the best quality and free from flaws and blisters. The hydrofluoric acid must be kept in leaden or gutta percha bottles, well stoppered with rubber corks. The plate of glass must be well cleansed and wiped dry and clean with tissue paper, and the letter or ornaments, that are to remain clear, must be pounced on the reverse side, and then the glass is laid flat on a suitable table with the side up that is to be operated on. The letters and ornaments as outlined by the pounce are covered with several coats of acid-proof protecting varnish, made from equal parts of asphaltum and paraffine wax, melted together and thinned for

spreading with turpentine. The edges must be clean cut and straight, or the letters or ornaments will look ragged. This done, make a border of soft beeswax around the edge of the glass to keep the acid from running over the sides. Now pour in the acid, so that the parts to be acted on are well covered, and let it remain long enough until it has eaten well into the glass. Pour off the acid and rinse immediately with clear water. Should the etching be too shallow, repeat the operation. When satisfactory, remove the wax border, as well as the protective varnish, which latter will come off readily by the use of benzine. As stated, however, the work is better by far when done by means of the sand blast, as it can be far better regulated at will and looks more like true chipping.

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Which Is Best, Liquid Filler or Shellac Varnish?

We would say that for ordinary work the commercial liquid fillers are more economical and useful, especially for soft woods, where beauty of the grain is of minor importance. However, where a high finish and rich effects are looked for, it is advisable to use shellac varnish instead of liquid fillers, which always produce a more or less clouded effect and tend to yellow off in time.

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Fire-Resisting Wash for Shingles.

We quote the following from the Scientific American of several years ago: Dissolve in a barrel of hot water 20 pounds of zinc sulphate, 20 pounds of powdered alum, 8 pounds of caustic potash, 8 pounds of oxide of manganese, and add 8 pounds of oil of vitriol. Pack the shingles loosely into another barrel and fill up with the liquid, keeping the shingles under the mixture by means of a weighted cover. Fill the first barrel also with shingles, and allow them to soak for several hours, then take them out and pile away to dry. Repeat this operation until all the shingles are impregnated with the mixture. Use rubber gloves for handling the shingles, and when laid on the roof coat them with a suitable oxide of iron paint.

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Size for Aluminum Bronze on Glass.

A sign writer wanted the best size for aluminum bronze for outside lettering on windows. He puts the bronze on dry, using first coat coach varnish, to which just enough yellow is added to color it the least bit. He has good results, because it sets quick and lasts well, except in cold weather, when it works too stiff. If thinned with turps it does not stand well.

We think your method perfectly proper for that class of work, but you must remember that a first coat coach varnish is not considered a first-class article for wear and durability. It is simply a filler for succeeding coats of varnish, and you should use what is known to the trade as durable body varnish, and of this only the best-known brands. This will work more freely, and can be thinned in cold

weather with a little turpentine without injuring its durability to any great extent. We would advise you to add to the varnish a little white lead in oil or flake white in japan, that has been tinted a very light lead color with a touch of lampblack. A teaspoonful of this to a pint of varnish is sufficient.

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Dressing for Linoleum Cloth, Also Polish for the Same.

A thin solution of beeswax in spirits of turpentine rubbed over linoleum will brighten its appearance.

A dressing for linoleum is made as follows: Melt over a moderate fire 20 ounces of paraffine wax of the soft variety, add one ounce of palm oil, and when both are well mixed take from the fire to a safe distance and add 4 ounces kerosene. Apply with a rag. The Pharmaceutical Era publishes the following formulas for polish for linoleum:

1. Melt one ounce of yellow beeswax and two ounces carnauba wax carefully; take from the fire and add 10 ounces turpentine and 10 ounces benzine. This is best accomplished in a water bath. Stir until cold, then apply with a rag and polish.

2. Melt 5 ounces yellow beeswax, add 10 ounces turpentine, stirring it well; then add 5 ounces of amber of kauri varnish. Apply with a rag and polish.

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Painting Plaster Paris Casts a Clear White.

Plaster casts may be coated in many ways; small articles may be coated and polished by dipping them in melted paraffine wax, and then rubbed smooth. New casts may be successfully coated and at the same time hardened by applying several coats, with a soft brush, of a hot saturated solution of either borax or alum, or a hot solution of chloride of barium, followed by several coats of soap water, made with ivory or white castile soap. The surplus soap is then washed off, until the clear water forms beads on the surface of the cast. These operations require but a few hours, and produce a hard surface, whose substance is insoluble in water, and prevent the yellowing off of the cast.

To protect plaster casts from soiling, they may be coated by means of a soft brush with the following preparation: White soap and white wax, one-half ounce of each, are sliced fine and boiled in two pints soft water in a clean vessel until the soap and wax are dissolved. This liquid must be applied cold, and it readily dries and does not sink in. By going over it, when dry, with a silk handkerchief lightly, its effect will be heightened. A delicate white finish may be given to old plaster casts or statuary by cleaning the figure first with soapsuds, then rinsing thoroughly with clear water and allowing it to dry. One coat of French zinc white, ground in damar varnish, thinned with spirits of turpentine, should then be applied, which will dry flat, over which another coat of the same material may be given, to which more or less of clear white damar varnish is added, according to finish desired.

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Testing the Purity of Linseed Oil with Nitric Acid and Other Means.

The nitric acid test is really simple, but in the hands of the novice rather non-conclusive and sometimes misleading. Equal parts, say five cubic centimeters of the suspected oil and nitric acid of 1.40 specific gravity are placed into a glass test tube or convenient bottle and shaken very thoroughly, then stood aside until two stratumis have formed in the tube on the separation of the oil and acid, which will take place in from ten to fifteen minutes, and the color of the two strata is observed. When the oil is pure linseed, the upper stratum is a light cinnamon brown, the lower colorless in the case of raw oil, while in boiled oil, the upper stratum may be a trifle darker, but the lower must also be colorless.

When adulterated with rosin oil, the upper stratum will be found dark olive to black, and the lower from straw to orange, according to the percentage of rosin oil that may be present. If 50 per cent. is present, the upper stratum will be rather black, but as little as 10 per cent. will be revealed by the dark olive color in the upper stratum and the straw color of the lower one.

When fish oil is present, the upper stratum will vary from brown to a brown black, the lower one from a light to a dark orange shade, according to the quantity of fish oil. When linseed oil is mixed with cottonseed oil, the upper stratum will turn reddish brown, the lower one very pale yellow, more or less so, according to the quantity of cottonseed oil present.

Linseed oil, adulterated with heavy mineral oil, will show similar colored strata as rosin oil.

For the presence of corn oil, we have no information as to the result of the nitric acid test, and would advise the moderate heating of the suspected oil which, when corn oil is present, will emit a sweet, mealy odor. By rubbing such oil briskly between the palms of both hands, the odor will make itself plainly evident.

The same may be said of fish, rosin or mineral oils, while cottonseed oil is more difficult to detect by these means.

A simple test for the practical painter, and one that cannot fail, is to make a freezing mixture of ice and salt, in which a tube or bottle containing a small portion of the suspected oil is inserted, together with the point of a thermometer. If the suspected oil congeals, that is, assumes a solid or butterlike consistency, before the thermometer indicates 18 deg. below the zero mark, the oil is not pure linseed. Cottonseed oil congeals, or rather freezes at 6 deg. F.; rosin oil at zero, fish oil at the freezing point (32 deg. F.); rape seed oil at 25 deg. F.

All of the oils mentioned become much more sluggish than linseed oil as soon as the temperature in which they are stored reaches the freezing point, and in the cold season they only need to be exposed and results noted. To determine exact quantities of adulteration, however, the services of an expert analytical chemist are needed.

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To Keep Venetian Red from Running on Second or Finishing Coat.

On painting a barn with Venetian red in oil, the first coat worked well and stood all right, but after applying the second coat, which looked nice and smooth, the sun struck the surface and it began to run until it was nearly all off. Five gallons of boiled oil were used to 100 pounds of the red, which had been successfully used on other jobs. The painter asked whether plaster of paris could be used in the mixture without injuring the wear of the paint.

We would not recommend the use of calcined plaster, because it will tend to the paint spotting white in case of rain, before it has an opportunity to dry hard, and sometimes even long after it has hardened. A good Venetian red that has been ground fairly fine in linseed oil, raw or boiled, and is thinned to brushing consistency with pure linseed oil and liquid drier or japan, will not run, providing the first coat is similarly mixed and has dried. When 100 pounds of Venetian red require only 5 gallons of oil for thinning, it must be pretty coarse, inferior stuff, loaded with barytes and cannot well stand any more dilution with pigments like plaster, gypsum or whiting. A good Venetian red will stand from 10 to 12 gallons of oil to every 100 pounds of paste, and not run when applied properly. Your case looks to us as one where rosin oil was used instead of boiled linseed oil, or else your red pigment was so coarse that oil would not bind it together.

When you have a case where good linseed oil paint runs or sags from being mixed too thin, and you have nothing at hand to make it stout enough to hold on, mix a little soda solution with your paint.

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Finishing a Mahogany Counter Top in Wax and Stained a Deep Color.

Stain the top with a deep, rich, transparent red lake, or with a mixture of burnt sienna and red lake, that have been ground very fine in oil and thinned with japan drier and turpentine. When this is dry, fill the surface in the usual way with paste wood filler that has been colored with the same material as the one that your stain is composed of. The richer and the more transparent these colors are, the more enhanced will be the beauty of your counter top after it is finished. Sandpaper lightly, when the filler has become hard. Dissolve white beeswax in spirits of turpentine to buttery consistency and apply one coat of same to the top with an ordinary varnish brush. Let this coat get hard, but do not begin to polish. Instead apply another coat and let this set up, then use a short bristle, stocky brush, something like a horse brush for polishing, which should be done with a rotary motion, bringing the full force down upon the brush. If the job does not look well with two coats of wax, give a third coat and polish again. Windows and doors should be left open to allow the more rapid evaporation of the turpentine. In our opinion, however, a varnish rubbed polish is more serviceable for a library counter top than wax polish, because the latter is always apt to be more or less sticky.

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Painting the Galvanized Lining of a Water Tank to Prevent Corrosion.

If the water contained in tank is to be used for drinking and cooking purposes, paint containing lead or lead salts must be avoided. Ordinary oil or varnish paints will not stick to galvanized iron on metallic zinc surfaces. Clean the tank thoroughly by scrubbing sides and bottom and allow to dry, then make a solution by dissolving 2 ounces each of chloride of copper, nitrate of copper and sal ammoniac in 1 gallon of water, and add to the solution 2 ounces of muriatic acid, and give the galvanized iron surface one full coating of the solution, allowing 24 hours time, when any good paint will adhere to it. Use two coats of zinc white in oil with manganese borate for drier.

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Resinate of Lead and Resinate of Manganese.

Resinate of lead is prepared by melting either pale or dark rosin and introducing into the melted mass under continued agitation with an iron or steel stirring rod or paddle varnish makers' litharge, until the mass becomes so stiff that it will take up no more and the lead oxide is thoroughly mixed with the rosin, which can be ascertained by dropping a portion of the semi-liquid mass on a strip of glass. As much as 12 pounds of litharge may be thus taken up by 88 pounds of rosin. To ascertain actually how much litharge should be used, it is best to first make a batch with an excess of litharge, weigh out a small portion of the resulting product, dissolve this in spirits of turpentine and determine the weight of the lead that settles out, which will show the extent of the excess.

Resinate of manganese is made cheapest by using the powdered gray or black oxide of manganese in the same manner as litharge is introduced into the melted rosin, but the process is much slower, the manganese being lighter in gravity and very apt to ignite and set the whole mass on fire, unless the kettle is walled in. The limit is $7\frac{1}{2}$ pounds manganese to $92\frac{1}{2}$ pounds rosin. Any excess of lead or manganese in either of these resins will precipitate on dissolving them in turpentine or benzine.

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Most Durable Paint for Smoke Stacks.

A certain brand of graphite paint was used for a smokestack, but did not last long.

The stack paint you have mentioned is one of the best preparations for that kind of work, but, of course, under very severe conditions it is bound to perish, as it cannot be considered a baking varnish, which is really the only coating that will stand great degrees of heat. Much depends on the size of the stack, its diameter, etc., and on the degrees of heat to which it may be subjected. We have seen smoke stacks painted with ordinary pigments, such as mineral brown, Venetian red or lamp black, where the paint has stood for years, while others, that were painted with more costly preparations did not last a

year. A great deal depends also on the original preparation of surface, as well as the binder in the paint.

For cheap work, a mixture of very finely powdered graphite and liquid coal tar will do good service, but if a good, durable job is desired a genuine asphaltum varnish, entirely free from rosin and benzine, with pure linseed oil as the medium for spreading, and turpentine as the solvent to which some high grade lamp black has been added, will prove the most durable coating, when applied in two coats, each well brushed out. In smoke stack painting, the cost of material is very small in comparison with the cost of application, therefore, it is folly or misplaced economy to apply inferior material because of lesser first cost.

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Peculiar Case of Peeling Off of Paint on Exterior of Building.

Samples were submitted of thick layers of paint peeled from a house that had been built five years before and painted by the contractors with Indian red. When repainted with olive green, in little more than a month, it peeled badly right to the wood.

We notice by examining the underside of the flakes of peeled paint that the impression of the grain of the wood is plainly visible on the red paint; that it is shining, as if the Indian red had been mixed with varnish, and that it has retained "tack" for all these years, simply because it was applied so heavy that the oil in the priming coat had no chance to dry thoroughly. To all appearances the paint was entirely too stout for priming, and there was not enough oil to penetrate into the wood to give a firm hold to the paint, and besides the oil may have been fatty or inferior otherwise. But no matter how pure the oil may have been, oxide of iron pigments generally, and Indian reds in particular, have the tendency to become alternately soft and hard as oil paints, according to weather conditions. That the red paint did not peel off previous to repainting we believe was due to its remaining rather soft and elastic. It certainly does not seem to have had a good hold on the lumber, and it merely needed a good hard drying paint, like the olive green you applied, to take a grip on it and pull it off. Your olive green acted in this case as an involuntary paint remover.

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How Should a Soft Pine Door Be Finished to Harmonize with Hard Pine Woodwork?

We think the simplest way to accomplish this is to give the soft pine door a few thin coats of orange or brown shellac or one coat of orange shellac and a finishing coat of hard oil finish that is not too pale, while the balance of the room that consists of hard pine, should be given a coat of pale orange shellac and a coat or two of extra light hard oil. It would hardly pay on cheap work to attempt to imitate the grain of hard or yellow pine on a soft pine door.

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How to Repaint a Badly Rusted Smoke Stack.

First of all the rust must be removed, which is done best by the use of steel wire brushes of suitable size, aided by saturating the incrustations with kerosene oil, which should be washed off with benzine when the rust spots have been removed.

If a good, smooth job is wanted, badly pitted places in the iron surface should be puttied up with a fairly stiff putty made of red lead, whiting and boiled linseed oil. If the stack is not subject to too great a heat and the expense not too much of an object, a coat of red lead in oil, followed by a coat of pure lampblack in boiled oil, will stand best. But if the stack becomes very hot when in use, so that oil paint is liable to blister, we would recommend the use of genuine asphaltum varnish, to which has been added some pure lampblack in oil or some of the very finest dry graphite. If the asphaltum varnish is free from rosin and made elastic by having been melted with the necessary portion of prepared linseed oil and thinned with turpentine, it will bake on the metal and stand very high temperature.

If not desirable on account of the corroded condition of the metal to go to much expense, one or two coats of black paraffine paint or refined liquid coal tar, with or without the addition of fine, dry graphite, will make a fine coating, but this material should not be laid on too heavy or it is very apt to run down the stack in laps. For thinning liquid coal tar or black paraffine paint turpentine may be employed, but light tar oil is cheaper and serves the purpose as well, and the brushes used can be cleaned in this solvent with best result.

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What Can Be Added to Paint to Keep Away Gnats During the Drying Process?

We have never heard of laurel oil and do not know its characteristics, but have no doubt that it has a pungent odor similar to cedar oil, whose odor is very effective in driving away moths. Oil of pennyroyal is very effective in keeping mosquitoes out of rooms when kept in an uncorked bottle, but we have no knowledge whether the odor of any of these oils would be strong enough in the open air to keep the gnats away from the paint while setting, as large quantities could not be added to oil paint. Try cedar oil, which is inexpensive, or spiritine oil.

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Lime-Proof Greens for Kalsomining on Sand Finished Walls.

The commercial chrome greens, which are composed of chrome yellow and Prussian blue, with a mineral base, such as barytes, gypsum or clay, are strongly acted upon by alkalies, which attack both the yellow and the blue, turning the former to an orange and the latter to a reddish brown, and therefore are not safe to tint kalsomine with, especially when the material is used upon sand-finished walls. Even the whiting used in the kalsomine will act upon the greens of this composition, and for tints made with Prussian or Chinese blue or

chrome green it is best to omit whitening in making the kalsomine and employ gypsum or china clay instead. If this plan is not feasible, however, then a limeproof green, such as Bremen green, ultramarine green or aniline green should be used for tinting. Bremen green is a copper green, and not affected by lime, but turns black in the presence of sulphur gases, while ultramarine green is unaffected by lime and other alkalies, as well as gases. In the aniline greens, lime-proof brands are offered as substitutes for copper greens. An ideal green for use in the presence of alkalies is the oxide of chromium green, known as Guignet's green, but it is very high priced and does not give strong, clear tints; neither can it be obtained in a variety of shades. Emerald or Paris green is too heavy a material and but a poor tinter, nor does it mix well with kalsomine. Ultramarine green, that can be obtained in light and dark shades, strikes us as best for the purpose.

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Washing Down and Revarnishing Wall Papers.

If your wall paper has been varnished properly, you can clean it by first dusting off with a counter duster and then washing down with soapsuds and soft sponge, using a soft brush for extra dirty spots, but we would advise you to first try it on an out-of-the-way spot in order to see whether the paper will stand this treatment. If it does, then proceed; but be very careful to sponge down with clear water to remove all traces of soap, and dry with a chamois skin. Do not soak the paper or let the water get back of it. When thoroughly dry, the most economical method is to give a thin coat of damar varnish. It is, however, necessary to first make a test on a small patch to see whether the varnish soaks into the paper, in which case a coat of glue size must be applied first. This size is prepared as follows: For an ordinary sized room, say, 16 by 16 by 11 feet, take 2 pounds best glue (gelatin in flakes) and boil same in sufficient water to make a size that can be applied smoothly and evenly. Let this stand for 24 hours to harden, then apply a thin coat of white damar varnish. Wall papers so coated may be washed with a soft brush whenever required.

To varnish wall papers that have not been varnished before, they should be given two coats of the glue size referred to, and one thin coat damar varnish. If they have been in use before varnishing and become soiled, they should be cleansed in the usual way with stale bread or bran.

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Vellum, Its Origin and Value to the Painter.

Vellum is a fine kind of parchment prepared from the skins of calves, lambs, or goat kids. The skins are immersed in lime, then shaved, washed and stretched on frames, where they are scraped and trimmed with the currier's fleshing knife. Next they are carefully rubbed to smoothness with pumice stone and finally polished with French chalk or fresh slaked lime, finely sifted and then dried. A bluish color is given them with a solution of indigo, while the green color is produced from a solution of verdigris, to which a mordant or fixative has been added. To produce a very fine, velvety surface, the

whites of eggs are employed and subsequent friction. Vellum and parchment are used by artists, as a painting ground for water colors, when they wish to employ something more durable than the ordinary sized paper, and Church, in his "Chemistry of Paints and Painting," says that water color paints placed on vellum, parchment and ivory sink either very slightly or not at all into their substance—a very few, such as aureolin, strontia yellow and madder carmine, stain the superficial layer. The old method of preparing vellum for the reception of water colors consisted in rubbing the surface with very finely ground bone ash, or with pulverized gum sandarac. Pumice stone or cuttlefish, reduced to a minutely divided state by grinding and sifting, also answers the purpose. We, however, believe that vellum, as used at present, is an imitation only of what it has been and is manufactured at the paper mills by modern process, similar to that of parchment paper.

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Enamel Top Dressing and Leather Carriage Top Preservatives.

The very best enamel top dressing that we know of, and which is not so very expensive, is prepared as follows: Dissolve in an iron kettle over a good fire, say, 25 pounds of high-grade asphaltum, Syrian or Gilsonite, in one and one-half gallons of varnish makers' litharge boiled oil; add 50 pounds burnt Turkey umber, that is ground fine in boiled linseed oil; stir well, and add one and one-half gallons more of varnish makers' litharge boiled oil; then boil the mass until it attains body, take from the fire, and when nearly cold, thin with sufficient quantity of turpentine to produce an easy flowing varnish or enamel.

The varnish makers' boiled oil should contain from one and one-half pounds to two pounds of litharge or red lead to the gallon of oil, and be of heavy body. The boiling of the preparation should be done in a moveable kettle and closely watched, as asphaltum and umber mixture readily boil over. The operation should not consume over two and one-half hours.

A good water-proof leather preservative for carriage tops is made as follows, the parts referred to being all by weight: 18 parts of yellow country meeswax are melted, and to this one part pulverized borax is added, and the mass stirred until a thick jelly has formed. In another kettle or pan 6 parts spermacetti is melted, and into this is stirred 5 parts of asphaltum varnish thinned with 60 parts spirits of turpentine, then the wax and borax jelly is added and the whole mass thoroughly stirred. Now 5 parts of vine black and 2 parts finely powdered Prussian blue are rubbed smoothly with part of the mass and then added to the same while still warm. Perfume with oil of myrbane (nitro-benzol.) and put into well closed cans. Apply with a cloth in small quantities, and rub out well, polish with a brush. Do not apply it too often.

Mr. M. C. Hillick gives the following formulas for leather top preservatives:

No. 1.—Neatsfoot oil 1 pint, beef suet, 2 ounces. Melt the oil and suet together. Then add a tablespoonful of melted beeswax, mixing all well together, and bottle. The beeswax has a cooling property greatly to be desired in a leather preservative.

No. 2.—Darken neatsfoot oil with drop black. Apply sparingly and rub out with soft rags. This does not give the brilliancy of finish that an enamel dressing does, but it gives to the leather a softness and pliability that cannot be obtained otherwise.

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How Old Gilt Frames May Be Cleaned and Renewed.

Old gilt frames may be cleaned by simply washing them with a soft sponge of suitable size wet with urine, hot spirits of wine or spirits of turpentine. The sponge must not be too wet, simply damp enough to take off the dirt and fly-specks. The frames must not be wiped dry, but allowed to dry of themselves. If this does not make them lustrous enough, the frames must be regilded, which is done by making some thin size from parchment and mixing some of this warm with water gold size, which is applied with a camel's hair brush in two coats. When dry, it is rubbed down with very fine sandpaper and is then ready for gilding. When the frame is covered, set it on its edge to drain. When perfectly dry, dip a pencil into water and wipe the gold over with it, which will take the surplus particles of gold off and make it appear solid. For any parts not covered, take bits of leaf with a dry pencil and lay on as before, then give the whole a coat of clear parchment size, brush the back edges over with ocher and the frame is ready.

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Cause of Paint Cracking and Peeling on Weatherboarding.

The cracking and peeling of oil paint on exposed wood-work may be attributed to several causes, chief among which are poor material, undue haste in applying the paint and poorly seasoned lumber. If the priming paint has been too brittle, cracking and scaling is the inevitable result; if the lumber is too green or one coat of paint applied over the other before the latter has had time to harden thoroughly, peeling will surely follow.

When inferior oil and cheap japans are employed in the thinning of the paint, or when the painter works on the idea that anything is good enough for priming, he will have just such results as you describe.

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Cause of Paint Peeling from Galvanized Iron and How to Prevent It.

Galvanized iron and sheet zinc require similar preparation in order to make oil paint adhere to the surface. It appears that in contact with air zinc oxide is formed on the surface of the metal, which throws off the paint in shreds or blotches a short time after it has become hard.

We have found that a mixture of equal parts of pure red lead and mineral brown by measure, thinned with equal parts raw linseed oil and turpentine applied as a first coat, has given very durable results in many instances, no matter what the finishing coat was composed of. But the very best results are had if either of the following washes are applied previous to first coating: Dilute muriatic acid is applied to

the surface, when muriate of zinc will form. That produces a film upon the metal, which takes a very strong hold on the same, and upon which oil paint will hold as well as upon black iron. Or two ounces each of chloride of copper, nitrate of copper and salammoniac are dissolved in a glass jar or earthen pot in one gallon of water and two ounces of muriatic acid are added. Either of these solutions are applied to the surface with a wide, soft brush, and when dry it is ready for first coating with any good oil paint.

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How Pressed Wall Paper May Be Hung with Satisfactory Results.

Pressed or embossed papers will not stick well on a hard wall, and here is where your trouble comes in. A double operation is required for this class of work. The walls must first be lined with brown paper, so as to give a more absorbent surface for the paste on the pressed paper to obtain a hold, so that the pressed figures will not be unduly moistened or soaked.

Without this lining pressed or embossed paper will not adhere without pressing down, which is the cause of obliterating the figures. The ordinary wheat flour paste will serve well enough for pasting the brown lining paper to the wall, but for the pressed paper the paste must be made quite heavy. Each piece of embossed or pressed paper must be trimmed with straight edge and knife before applying the paste, and while this requires greater care in putting on the paste, it is absolutely necessary, in order to get the paper on the wall quickly, before the paste has an opportunity to soak into the relief figures and make them limp and flat. A very soft brush must be used in applying such paper in place of the stiff brush or roller, and the seams must be permitted to dry before using the seam roller, and even then this roller must be used gently, because the color is apt to leave pressed or embossed paper more readily than is the case with ordinary papers. Do not attempt to press or stretch the paper.

— 500 —

Burnishing Gilding and Burnishing Size.

To burnish gilding successfully a good deal of experience is required. The burnishers use either flint or agate, preferably flint, and for different work they should be of different forms. When the burnishing is done, those parts that have not been burnished must be weak sized, that is, they are wetted with water in which just a trifle of clear size has been melted, which helps to secure the gold. When dry the gold is wiped with a piece of soft cotton wool to remove rough or ragged edges of gold, and if any defects are now shown in the gilt these must be corrected by cutting up a leaf in small shreds, laying them on the defective places previously wetted with a camel's hair pencil.

Burnishing size consists of such ingredients as pipe clay, red chalk, flake graphite, suet and bullock's blood; and can be purchased from supply houses in the larger cities.

— 501 —

To Make Flour Paste That Will Not Liquefy.

The proper way to make the paste is to take two pounds best wheat flour and one pound of starch, mix each separately in cold water to a stiff batter, beating out all the lumps, then thin with more cold water to a pudding-like batter, mix the flour and starch batters in a pail; have some boiling hot water ready in which has been dissolved one and one-half ounces of alum, which pour on the batter gradually while stirring the mass vigorously until the paste swells and thickens, meanwhile turning darker. It is now cooked. Should by any chance the paste become too thin, it may be stiffened by cooking over a slow fire.

— 502 —

What Is Burgundy Pitch and Canada Pitch?

Burgundy pitch is an impure rosin, prepared from the spruce fir of Norway. Canada pitch is pitch from hemlock spruce fir. Burgundy pitch is imitated by melting ordinary rosin and linseed oil, 100 pounds of the former to one gallon of the latter, and enough annatto or palm oil to color.

— 503 —

Gilding on Brass and Copper.

The following formula is given by the Scientific American for water gilding brass or copper: Convert $6\frac{1}{4}$ pennyweight of fine gold into chloride and dissolve this in one quart distilled water, then add one pound bicarbonate of potassium and boil the mixture for two hours. Insert the articles to be gilded into the warm solution for a few seconds up to one minute, according to the activity of the bath. We presume, however, that the cross you wish to gild is too large to place in a bath such as here described, but should think that the solution could be applied as a wash with the brush, and that, if repeated several times, would serve the purpose.

— 504 —

To Clean Smoky Ceilings Preparatory to Painting in Distemper.

Would suggest to dry brush the ceilings well and wash with a strong solution of pearlash and immediately sponge off with clear water. When dry, give a thin coat of freshly-slaked lime, with a fair portion of alum that has been dissolved in hot water added. When this has dried hard, give a coat of size and proceed with the water color.

In using the pearlash solution, the hands of the workmen should be protected with rubber gloves.

— 505 —

Paint That Will Hold on Brick Walls Showing Efflorescence.

To make paint hold on brick walls that show efflorescence, it is necessary to first remove this white powder, usually,

termed saltpeter, by washing with a mixture of muriatic acid and water, equal parts, and at the same time scraping off all the loose paint. When this has been done, sponge well with clear water and let the brick dry thoroughly before painting. The painting should be done after a spell of dry weather. It is a difficult matter to cure such walls entirely, but when the salts have been neutralized by the means referred to and a few coats of good oil paint applied, allowing each coat to dry hard before applying another, further exudation of soluble salts will scarcely make themselves apparent.

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Paint for the Outside of Walls of a Stone House.

We would advise you to use a strictly pure, oil paint, omitting turpentine, benzine, etc., entirely, and using only as much japan as is absolutely necessary. For first coat we would suggest that pure white lead, tinted to suit with oil color, be thinned with pure raw linseed oil and a trifle of japan, and that this priming should not contain over ten pounds of white lead and color to each gallon of oil and japan, while in succeeding coat or coats not over five gallons of oil and japan be used for 100 pounds pure white lead. Of course, if the color is to be deeper than a light tint, then more oil will be required. If the tint is to be very light or delicate, or if the paint is to be clear white, about 15 per cent. zinc white may be added to the paint for the finishing coat, which will give a cleaner tone and prevent possible chalking.

— 507 —

How a Bright Orange Color May Be Made.

Red lead and yellow ocher will not make a good orange color, as both are too dull. Your dark chrome yellow probably was not strong enough to admit of white being mixed with it and the color became too flat to meet your views. If you purchase a dark or orange chrome yellow bearing the brand of any reputable color manufacturer, you will most likely find it rich enough in tone to suit, and if not, you can tone it with vermilion or red lake to deepen it or with a lighter shade of chrome yellow and white to make it paler. Should first cost be too high for the work in hand, you can reduce by adding bolted whiting or fine gypsum, as chemically pure chrome has great covering power.

— 508 —

Refinishing Interior Woodwork, Now in Whitewood and Light Walnut, in Cherry.

We should say that the best way to proceed is to thoroughly remove the varnish by means of strong aqua ammonia, to which a little turpentine is added, say one part turps to two or three parts ammonia. This addition of turpentine will prevent raising the grain of the wood and darkening it. When the varnish has been removed in this manner, the surface should be washed down with clear turpentine or benzine and permitted to dry. If during the process

some of the filler has also been removed, it is best to first stain the wood with a cherry stain that is of good strength, and then refill the wood with appropriate filler, smooth, sandpaper and revarnish. If you wipe your stain at the proper time, we do not see why the natural grain should not show through, providing you make your cherry stain from a burnt sienna of good, rich transparency, enriched with some orange lake or red lake. For this refinishing the stain should be nearer mahogany than cherry to enable you to get what you desire, but above all, the stain must be strong and rich, and wiped before it sets up too much. A good pale interior varnish or first-class hard oil finish seems to be the proper finish.

— 509 —

Softening Hard Putty and Taking Out Window Panes Without Breaking the Glass.

Take three pounds of quick stone lime, slake it with hot water, then add one pound American pearlash. Have it in the consistency of a soft paste, and apply it to both sides of the glass where it is laid in the putty; let it remain for twelve hours, when the putty will be soft and the glass may be taken out without breaking. The putty can then be removed easily by scraping. Soda ash or caustic soda may be used in place of the pearlash. When the putty has been scraped off, the surface from which it has been removed should be washed with vinegar and allowed to dry before the new glass is put in.

— 510 —

Cleaning Violins and Violin Bows.

For cleaning of violins, saturate a piece of soft silk with ordinary paraffin oil and proceed to wash the violin with it. The effect is a quick one; the paraffin dissolves the crust of dirt and rosin, cleaning the varnished surface without injury.

For the bow, take a small piece of flannel, wet with cold water, and rub it well over with yellow soap, double it, holding the hair between the finger and thumb, rub gently until clean, using plenty of soap; then rinse out the flannel, wipe off the soap, then wipe dry with a piece of soft muslin or linen. In an hour the bow will be ready for the rosin. The polished back of the bow may be cleaned with paraffin oil.

— 511 —

Sanitary White Paint for the Inside of a Wooden Tank Containing Drinking Water.

In the first place the tank must be dry before it can be painted. When the wood is water soaked, paint will not adhere. Naturally white lead in oil would be best for priming coat, but medical authorities are opposed to the use of lead or lead salts in minute quantities even. This leaves oxide of zinc as the only safe white pigment that has covering power enough for the purpose, because some authorities draw the line also against the insoluble lead sulphate and against lithopone white. Zinc white, ground in pure raw linseed oil and thinned with manganese boiled oil and some turpentine may be

employed as a coating without injury to the health of those using the water.

— 512 —

How Many Square Feet of Surface Is a Man Able to Cover in a Day of Nine Hours?

This question has too many sides to answer in these columns, and it depends upon the class of work to be done. When a painter works on a wall, where he can reach every portion from the floor or at most from a low trestle platform, he can do more than when he works from a ladder or a scaffold, and he can cover more surface than when he paints window frames, sash-work, cornices, etc. We should say that a painter with a full bristle pound brush can, on the side wall of a frame building, cover 720 to 800 square feet, one coat, in a day of nine hours and do it well, provided the paint works well and he is not afraid of using elbow grease.

— 513 —

How Is Wood Polished?

There are various methods for wood polishing; the oldest method known is oil polish, which is very simple. Apply either raw or boiled linseed oil to the wood, but not in a heavier film than the wood can absorb. Take a heavy block of wood and nail a piece of felt to it or wrap the felt around a square piece of stone and rub the surface until no more oil is to be noticed. Let this stand for a few days and repeat the operation every few days until a satisfactory gloss is obtained.

This method, however, is very expensive and requires weeks, even months, to accomplish the desired effect.

French polish, too, is very expensive and we would say that the American method is the quickest and therefore least costly.

After the wood has been filled and varnished, the surface is rubbed with pumice and water to a dead level and then well cleaned to prevent scratches in polishing.

The quickest way to produce the polish is to take a handful of raw cotton and dip it into a mixture of equal parts of refined cottonseed oil and alcohol and rub the job with a rotary motion and a fine luster will appear shortly, and with a little skill on the part of the operator a fine polish is the result.

— 514 —

Receipt for Making Terra Cotta Paint.

Two parts French yellow ocher and one part medium Venetian red by weight will make a good terra cotta color, while five parts of white lead, mixed with one part of burnt Italian sienna, will produce a strong terra cotta tint.

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Green Stain for Woodwork.

To make a good green stain for woodwork take chemically pure green, ground in oil, for the proper shade, and add japan sufficient to make it dry and thin the resulting mixture with spirits of turpentine

or naphtha. If too bluish, add chrome yellow; if too yellowish, add Prussian blue or drop black, or both blue and black. If the stain is strong, thin it out more. Fine green stains may be produced from aniline greens, but they are not fast to light, as a rule.

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Painting in Imitation of Granite.

If you wish to imitate the gray granite, have your ground color light gray or light lead. Mix your black and white for spattering with enough turpentine so that they will not run and spatter, first with black, then with white, by striking the brush against a heavy stick, which is held close up to the work. The brush should be stubby and broad, and must not be too full or it will make blotches. This method is much quicker and does not require as much skill as stippling with a sponge, and both colors can be spattered on one after the other without waiting for the first to dry.

To imitate red granite, the ground should be a salmon tint, made from white ocher and Venetian red, while the spatter colors are black, red and white, and are applied as described in the method of imitating the gray granite.

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Rough Plastered Walls and Ceilings That Are Spotted and Water Stained—How to Proceed in Repainting in Water Colors.

In the first place, you should tell the trustees of the church that they must have the roof looked after, as well as the gutters or valleys of the same, or you cannot guarantee to keep back the stains.

To prepare such walls and ceilings as you describe for repainting, broom them down, fill in the cracks in the usual manner and give the ceiling a thin coat or wash of clear whiting and water, which will bring out all the hidden water stains on drying. If the stains are bad, a coat of a mixture made of equal parts boiled oil, japan and turpentine must be applied over the stained surface, followed by a coat of shellac varnish and a thin coat of flat lead. If the stains are light only, a coat of shellac varnish and a coat of flat lead will hold them back.

The coat of flat lead must be given because water color is liable to scale when applied directly over varnish. For cheap work, a coat of wall or ceiling varnish (sometimes termed suction varnish) will serve the purpose as well as shellac, but for the reasons mentioned above the coat of flat lead should not be omitted.

The parts of ceiling where there are no stains and the walls should be washed down, permitted to dry and sized with a soap, alum and glue size, made in these proportions. One pound of good white glue is soaked in a quart of water, then dissolved in boiling water, one pound bar soap is also dissolved in one quart of boiling water and two pounds of pulverized alum in one quart boiling water. The glue and soap water are then mixed and to this is added slowly, accompanied by continued stirring, the alum solution. Add enough water to make of the consistency of thin syrup. Water colors will work freely on this size and the result will be uniform.

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Cheap Oils for Roof Painting.

Rosin oil will probably last for two years as a paint when mixed with mineral paint that has been ground in linseed oil to a paste, but we doubt as to whether the tin roof will last that long. Rosin oil, thinned with one-fourth of its volume of benzine (naphtha) 62 deg., will work freely and hold on well to tin when used with mineral paint, but it will alternately become hard and soft, according to the conditions of the atmosphere. When tempered with a small portion of japan drier and about 20 per cent. of raw linseed oil, it will stand for about two years on tin or iron, but the surface must be free from rust.

There are numerous paint and putty oils offered, and some of these will no doubt do the work desired. A new tin roof costs more than ten times the value of the paint applied upon it, and if the roof rusts and goes to pieces in two years, such paint is dear at any price and the painter will find it so to his sorrow.

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Apparent Causes for White Lead and Zinc Paint Turning Black in Streaks.

A new building was painted with two coats of white lead and linseed oil; turpentine in second coat, but no driers in either coat. In the last coat, 20 per cent. zinc white was used. In two weeks the building was badly streaked with black, especially the porch posts. The weather had been damp and rainy. There were no trees near the house and no smoke to amount to anything within a mile; but, when the painting of the house was nearly completed a 36,000-barrel oil tank, two miles away, was struck by lightning.

When painting in damp weather it is always more safe to use a moderate quantity of driers in oil paint in order to make it dry harder, so that the finished surface is not so liable to take up the dust from sudden storms, and the precipitate from smoke. To all appearances the smoke from the burning oil has caused the streak, and it might be well to try a little weak soapsuds with a sponge on some of the blackened portion of the paint to see whether the blackening is only superficial or whether it extends all the way through the coating of paint. We know of the experience of a painter who painted a frame house in white, which was nearly three miles from a lampblack factory. After applying the finishing coat and before the paint had well dried, a storm carried the smoke and soot over the surrounding country, giving the house in question the appearance of a salt and pepper suit. However, we will not insist that it was the effect of the smoke from the burning oil, and should like to know what brand of zinc white was used, as we have a strong suspicion that lithopone white, a sulphide of zinc and barium sulphate combination, is sometimes sold as zinc white, and we know that this material, when mixed with white lead, will streak black on exposure.

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Brick Paint to Pencil Over and to Wear Well.

You can buy flat brick paint in any shade of red or Milwaukee brick color in paste form, and all you require is to thin it with turpentine so that it will dry flat when applied over a ground of oil paint of similar color. You can pencil this without trouble with white lead in oil and turpentine for white joints, or with drop black or lampblack in oil and turpentine for black joints. If you do not care to purchase the prepared flat brick paints, you can mix the desired color yourself by mixing stiff ground Venetian red and yellow ochre with japan and turpentine for flat brick red, and white lead, yellow ochre and a little raw umber for Milwaukee flat brick color, also thinned with japan and turpentine. Whether this paint will wear well depends upon the elasticity of the ground coats, of which there should be two for unpainted brick surface.

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How Pine Tar or Coal Tar Paint May Be Thinned So as to Spread Without Heating.

If your tar paint consists of pine tar, use spirits of turpentine to reduce it to free spreading consistency. Do the same if it is a mixture of pine tar and coal tar. But if it is straight coal tar dilute it with oil of tar, the so-called light oil or creosote oil.

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Stopping or Waterproofing a Wooden Tank Without Injury to the Water.

No matter what material you are going to use it will not adhere or serve the purpose, unless the tank is drained well and permitted to dry out thoroughly. Then the hoops must be tightened and the inside be given a coat or two of hot paraffin oil or melted paraffin wax, applied hot. This done, give the iron or steel hoops a coat of red lead and the outside of the tank one or two coats of good, elastic oil paint of any color desired. This is the best suggestion we have to offer for this class of work.

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How Brass or Copper Signs Are Made.

This work is done by etching with acid. To make a brass sign, procure the suitable metal, clean the surface and paint it with asphaltum varnish, leaving the letters or ornaments unpainted. Put a border of soft beeswax around the edge high enough to hold the acid. Dilute nitric acid with five times the quantity of water and pour this diluted acid on the surface about one-quarter inch deep. When the letters are cut in deep enough, which must be ascertained by trial, the acid must be poured off and the plate cleaned by repeated heatings and wiping and finally washed with turpentine. The letters may then be filled in with a cement, made by mixing equal parts of asphaltum, shellac and lampblack, which is melted in by heating the plate and

smoothed over with a hot sad iron. When the cement is hard, the sign may be polished.

Copper signs are more difficult to prepare, and unless one has experience in that line he had much better not try the experiment. The surface must be prepared first by cleaning it with photographer's emery paper, then a solution of yellow beeswax in turpentine, decanted until no sediment remains, with one-eighth of its volume of japan varnish, is used as a ground for etching. This solution must be applied hot, as a bath, in a porcelain dish to the plate until the color of the plate darkens uniformly, for if one bright spot remains it shows that there is a grease spot still left, and all must be gone over again. When the etching ground has dried, the surface must be smoked with twisted tapers, holding the plate upside down; then it is dried and ready for the etching. The letters are marked out by removing the ground with steel needles or steel points. Needles are, of course, used only for very fine lines, while appropriate steel points are used for the heavy lines or letters.

The etching fluid is variously described in the following formulas:

Lalanne recommends: Nitric acid, 40.0, mixed with equal quantity of water, adding bits of scrap copper.

Another suggests: Nitric or sulphuric acid, one part; saturated solutions of bichromate of potash, two parts; water, five parts.

While we do not desire to deter the progressive painter from experimenting, we rather think that this kind of work had best be left in the hands of those who make a regular business of it, as it is a waste of time for a busy man to engage in undertaking to make copper signs, when they can be obtained at a much lower figure than the materials required would cost the experimenter.

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Best Method of Laying Patent Gold Leaf on Wooden Surfaces.

Patent gold leaf is used exactly in the same manner as the regular leaf. It is only prepared so as to save the leaf when gilding is done outdoors, and awnings need not be erected to keep the leaf from blowing away. It is so put on that the adhesion to the size is greater than to the leaf of paper, and so comes off onto the work as desired. In laying the leaf use the ordinary size and proceed in the usual way.

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How the Settling of Enamel Paint May Be Prevented Without Impairing Drying Quality.

Not knowing the composition of your white enamel, it is difficult for us to say what you should use to keep it in suspension. Enamel paints that are well made, as a rule, do not require frequent stirring and do not tend to settle to any extent in the can or other package.

The rapid settling may be due to the use of one or more pigments of heavy specific gravity, such as white lead and barytes or lithopone, or it may be due to the use of varnish of light body. In either case, the remedy is to add a pale varnish of very heavy body, which you know to be a quick drying medium.

If you make your own white enamel and intend it for interior work only, use the best French zinc, ground in damar varnish, break up the paste to the consistency of flour paste batter with turpentine, and add sufficient of the best white enamel varnish obtainable to make a free flowing paint of good gloss. To make one gallon will require one ten-pound can of French zinc in damar, less than one-half pint turpentine and about one-half gallon white enamel varnish. In every case the enamel should be strained through a fine wire sieve or through cheese cloth. Enamel paint made on this plan will not settle readily and may be rubbed down with pumice and water in 48 hours, or with pumice and crude oil in from 72 to 96 hours. For exterior work, a first class white enamel of great durability can be made by using equal parts of flake white in japan and French zinc ground in damar, thinning in similar manner, with the exception that the varnish employed should be a very pale outside varnish.

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How Dry White Lead Is Pulped and Ground in Linseed Oil.

When white lead corrosion has been accomplished and the coarser particles of uncorroded metallic lead have been removed in the separating apparatus, it is put through rollers and passed into screens that revolve under water, so as to prevent the raising of dust, and in this manner is freed from the finer particles of metallic or uncorroded lead, the so-called trailings, which are used in the manufacture of oxide of lead. Through an opening in the bottom of the tank, in which the second screening takes place, the white lead and water together pass into the hopper of a burr mill, which grinds the material to impalpable fineness and passes it into a series of floating tanks, the finest lead being carried to the farthest of the tanks, the coarser being deposited in the tanks nearest the mill.

In this way the lead becomes "pulped" and is run off or pumped into large tanks, when it is agitated by compressed air, allowed to settle and the clear water drawn off. Then more clear water is allowed to run into this tank, and the pulp stirred again and this process is repeated, until all traces of acetate of lead are eliminated by this so-called washing. The pulp is then either placed on drying pans for the production of dry white lead, which is afterward sold dry or mixed with linseed oil and ground on burr stone or roller mills, or it is allowed to run into long cylinder-shaped mixers in vertical position, that have a stirring device suited to the purpose. When this is in operation, the required quantity of pure linseed oil (no other oil will do it), is allowed to run in, and in a short time the lead and oil mix and unite in the bottom of mixer, leaving the clear water on top. After this water has been drawn off, a gate in the bottom of the mixer is opened and the lead and oil mixture run off into a cooler, where a trifle more oil is added, which expels the remaining water, that is also drawn off. Now the mixture is run through a mill, preferably a roller mill, and the product is finished. White lead in oil ground in this manner has been designated as "pulp ground lead," while that ground from the dry lead has been known as "dry ground." The latter may always be

recognized by more or less clear oil being found on top in opening package, while separation of oil rarely takes place in the "pulp ground" article.

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Preventing and Curing Mildew or Mold in Basement Walls.

House mildew or mold, is the hardest of all fungus growth to prevent or to cure, because it is caused by dampness in the foundation walls and lack of proper ventilation. By placing about a few deep plates or pans of quick lime, renewing the same as often as it becomes slacked, in damp basements, closets or cellars, the appearance of mildew or mold may be prevented and sometimes it may effect a cure, especially when not too deep rooted. In your case the usual remedy, i. e., a wash with muriatic acid would hardly answer, because the surface is painted, nor would melted paraffin, applied hot, do much good, because this remedy is efficacious only when applied to the bare wall and worked in with a paint burner.

Dr. Theo. Koller, in "Die Mappe," says: As to paraffin, there is not a more elastic material which protects more against dampness and atmospheric influence than this product of petroleum. As the cheapest kind of paraffin may be used for the purpose, cost need not be an obstacle in its use. One part of paraffin, melted in three parts of heavy coal tar oil in a water bath is a superior medium to coat foundation walls or any part of a building exposed to dampness or other atmospheric influences. To have this solution of paraffin and coal tar oil in proper condition for application, put the vessel containing it into a large vessel of hot water, same as you would melted glue, and apply several coats with large wall brushes.

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White Ocher, Its Origin and Composition.

We have no exact data at hand as to the origin of the term white ocher, and our earliest recollection of its existence dates back about twelve years, when it made its first appearance in some Western towns. It is now generally sold by jobbers as white or priming ocher, and is, no doubt, another fancy name, invented by some enterprising paint grinder or salesman for one of the so-called combination leads in which pure lead is conspicuous only by its utter absence. The composition, so far as the pigment is concerned, consists of barytes chiefly, with a small portion of zinc white or lithopone, or probably sublimed lead to give some whiteness to the mixture. The percentage used of these pigments vary with the selling price, as does also the quality of oil in which the pigments are ground. We will not go far astray if we place the percentage of barytes at from 75 to 90 parts of the total pigment, and also in saying that most of the brands contain only small amounts of pure linseed oil, balance being cottonseed or mineral oil. These so-called white ochers being sold mainly for priming purposes, as they would have but very inferior body for finishing paints, you can readily see what little real value there is in them, and a painter who values his reputation and who is intelligent enough to figure costs of material comparatively, will steer clear of such products. Try it

for yourself; ask your supply house to obtain a 25-pound can and make a test against pure lead or pure zinc white by mixing each with the requisite amount of thinners and spread the resulting paints over any given surface. As you have handled yellow ochers for years, you know that pure French or American ochers consist of oxide of iron, silica and alumina, and that they never contain barytes. Therefore, if there were any white ochers in existence, they would contain neither oxide of iron, nor any barytes, and the nearest natural mineral that might be classed as white ocher would be kaslim, or China clay.

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Imitating Ground Glass on Ordinary Window Panes Without Removing Same.

In order to roughen the glass by means of acid, you will have to remove the sash and lay it on trusses horizontally, clean the glass thoroughly on the side to be operated on, then moisten the panes all over with white, or French acid. When roughened sufficiently, wash thoroughly with clean water.

To imitate ground glass cheaply, there are several methods. The first of these is made known by Leon Vidal, and consists of a varnish made as follows: Eighteen parts of gum sandarac and 4 parts of gum mastic are dissolved in 200 parts ether, to which is added 100 parts coal tar benzol. The glass is thoroughly cleaned and the varnish applied until the desired effect is produced.

Another method which steam vapors will not affect or destroy, is to put a piece of glazier's putty into muslin, then twist the fabric tight, until it has the form of a pad. Clean the glass well first, then pound it lightly with the pad, from which sufficient of the putty will exude to render the stain opaque. Let it dry hard and then give it a coat of pale, durable varnish. If a pattern is required, cut it out of paper as a stencil; place it so that it will not slip and proceed as above. If letters or ornaments are too clear, cover same with opaque varnish.

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Chipped Glass Sign Effects Produced by the Use of Acid.

We have plainly stated that the best chipping is done with the improved sand blast, but in giving the older methods for the benefit of those who cannot use the sand blast, we have omitted several important points. The chipped effect can be produced, as you say, by applying hot glue to ground glass, and it can also be produced in similar manner when the glass has been treated with white or French acid, which you can obtain from any druggist, and gives a perfectly matt surface, similar to ground glass. This acid consists of one part by volume of fluoric acid and two parts by volume of liquid ammonia and must be used without any addition of water.

If, however, a clear chipped glass design is wanted, the surface must be first treated with hydrofluoric acid to eat off the enamel, then rinsed and allowed to dry. Then the glass is covered with fine groats, using the protecting varnish referred to for the purpose, and when the groats are dry, very dilute fluoric acid is poured upon the plate. The groats

act as a shield and produce the raised portions seen in chipped glass. When the acid has eaten deep enough in the unprotected portions of the surface, the acid is poured off, the glass thoroughly rinsed and the protecting film removed with benzine or turpentine.

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Freehand Relief on Canvas-Covered Walls—How to Prepare.

If the canvas-covered walls are well painted, a flat coat of paint is all that is required to hold the relief work, but if the canvas is absorbent, a size composed of equal parts linseed oil, drier and turpentine must be applied in order to give the relief a good hold. In other words, it is necessary to stop suction, and the size mentioned is best adapted to the purpose. Where absorption is very much in evidence, hard oil may be used, but glue size should be avoided.

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Oil Drier That Will Not Change the Color of Oil Paints.

The use of alkalies is unnecessary in the manufacture of driers, and is only resorted to in very cheap grades, in order to give additional hardness at lowest possible cost or in order to harden the rosin used in preparing cheap driers. Good oil driers should be free from any sort of gum, and especially free from rosin. To make a good oil drier of medium color, which will not materially affect the color of oil paints, the following ingredients are best adopted:

Twenty gallons of well-settled raw linseed oil.

Twenty pounds red lead.

Twenty pounds litharge, powdered.

Ten pounds white sugar of lead.

The oil is first heated to the boiling point, and the lead oxides and lead acetate introduced gradually, while the oil is being constantly agitated. The temperature should not be allowed to rise above 250 deg. C. at any time, or the product will be too dark. When the mass has assumed a bronze brown color and become rather viscid, a sample is put on a strip of glass and on cooling it must harden free of tackiness. On reaching this stage the kettle is removed from the fire and before the mass has cooled off too much, it is reduced to liquid form with spirits of turpentine, of which about 40 gallons are needed.

For a pale drier borate of manganese is substituted for the lead oxide, and for 20 gallons of linseed oil 10 pounds borate of manganese and 10 pounds white sugar of lead is sufficient, and the temperature in boiling should not be allowed to rise above 220 deg. C. This requires to be heated for a longer period, but the thinning is to be done as above.

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Refining and Bleaching Raw Linseed Oil for Use in Grinding White Lead.

We do not know of any process that will bleach linseed oil white unless by a very slow method, which takes too long to admit of using it in manufacturing on a large scale. This is bleaching by sunlight,

and is all right for the purposes of the artist or small painter. The bleaching process by the use of chlorines is not a safe one, as the bleached oil cannot be freed entirely from the chemical. Pure white lead acts itself as a bleaching agent on the oil; when air is admitted and when white lead is ground in raw linseed oil and thinned with raw oil for exterior work, it will, although of a creamy yellow color on first application, bleach out white in a very few weeks. For interior work, of course, it is best to have the lead ground in refined or bleached oil, especially where the work is to dry flat. But even here it is not necessary to have the oil water white, it being sufficient, when the oil has had all albuminous and mucilaginous matter removed by refining and has assumed a very pale greenish or yellowish color. This stage can be attained in a large way by the sulphuric acid treatment. Be it remembered, however, that only the pressed oils can be thus treated with success; extracted oils are too light in body to be decolorized by such a method. These will become darker and redder in contact with acid.

The apparatus necessary to refine oil consists of two oblong wooden boxes, which are set on top of one another, that on top being about one foot shorter than the other, both of sufficient width and depth to hold a given quantity of oil. They must be lined inside with sheet lead all over, bottom and sides, and the bottom of each is to be triangular in shape, in the center of which is a perforated lead pipe for the purpose of agitating the oil in the top box and of washing the treated oil in the bottom box with steam. Over the top box runs a perforated lead pipe coil, with a leaden funnel attached. There are spigots attached to the boxes, the one in the top box for the purpose of draining the treated oil into the bottom box, and two spigots in the bottom box, one about a foot above the bottom, to draw off the clear, refined oil, and one at the bottom to draw off the water from the condensed steam which has collected in the bottom of the box. The top box is termed the treating tank, the lower one the washing tank.

The treatment consists in the following: Well settled raw linseed oil is placed into the treating tank to within a foot of the top, and the oil agitated by compressed air, supplied from a rotary pump or otherwise, and sulphuric acid of 66 deg. Beaume (oil of vitriol), slowly distributed over the surface of the oil so that no charring can take place, by means of the perforated lead pipe, the acid being poured into the leaden funnel. One pound of acid is generally sufficient for every 100 pounds of oil, and when all the acid is distributed the agitation is kept up for from six to eight hours. After resting for twelve hours, the scum is removed and the oil tested, which should have a greenish color, in an ordinary test tube. Now the oil so treated is run off into the washing tank and the steam turned on, so as to agitate the oil with moderate violence. This should be continued for a whole day and the scum forming on top removed from time to time. The steam is turned off in the evening and the oil allowed to rest during the night. Next morning steaming is started again and continued for another day. Now the oil is tested for remaining traces of acid by means of litmus paper, and, if traces of acid are still found, the water is drawn off through the bottom spigot, and steaming resorted to again. To neu-

tralize any remaining traces of acid, a small quantity of lime water is put into the washing tank during the last steaming. The oil is now pale, but still turbid, and before use should be drawn off into settling tanks that are open at the top to admit light and air, when the oil will be clear and fairly well bleached inside of ten days.

— 534 —

Refilling the Black Letters in Brass Signs.

Clean all the old black out of the letters carefully, then heat the plate and melt black sealing wax into the letter spaces. Even the surface with a warm sad iron and scrape off the surplus. Finally hold a warm sad iron over the letters to bring out the glaze. A cement, which is used in the same manner as the black sealing wax, is made by mixing equal parts of asphaltum, shellac and lampblack, and melting this in the letters. Still another filling is made by taking equal parts of asphaltum, varnish and brown japan, with enough dry lampblack to form a stiff putty, which is pressed into the spaces with a putty knife and the edges cleaned off with turpentine. When the filling is dry the whole plate may be polished. The cement described first hardens as the plate cools off; the last one requires a few hours to become hard enough to polish over.

— 535 —

How English and American Vermilion Should Be Mixed for Sign Work, so as to Insure Good Wear.

English vermilion (or quicksilver vermilion) is sulphide of mercury, and very easily affected by strong light, which in time will turn it very dark, no matter how well protected by varnish. The pale shade will darken much more rapidly than the deep shade. There is no protection against that; it is in the nature of the material.

American vermilion, or chrome red, is the basic chromate of lead, and while it is a good wearing pigment it soon loses its original scarlet red color and turns to a dull brown on exposure to strong light. Good, durable outside varnish will protect both of these vermilions from too rapid darkening, but cannot arrest the change for any great length of time. We do not think that varnish should be used in mixing either of these for sign grounds, even when the signs are to be varnished over, and would suggest the use of one part of a good drier, five parts of pure raw linseed oil and four parts of turps. Or, if you have a strong drying boiled oil, omit the drier and make your thinners from three parts of this boiled oil and two parts turpentine. Mixed in this way, either English or American vermilion will flat sufficiently to be varnished over and contain enough binder to wear well, provided the oil is of good body and the turpentine strictly pure.

The lasting quality or durability of the paint will depend largely on the quality of the varnish that is placed over it, and the permanency of the color depends to a great extent on the degree of exposure which the signs will be subjected to.

The use of both English and American vermilion has, for some years past, been very much curtailed by the substitution of the so-called red lead and eosine vermilion, which, however, instead of darkening, for

the most part fade or bleach very quickly on exposure. If you are looking for something more unchangeable than either of those mentioned, we should advise you to try some of those non-fading or permanent reds or vermilions that have been so largely offered to the trade of late.

— 536 —

Staining Woodwork with Acids.

For staining wood brown, sulphuric acid, more or less diluted, according to the depth of stain desired, is applied to the wood, previously cleaned and dried with a brush, and when the acid has acted enough its further action is arrested by the application of liquid ammonia.

To age oak artificially, liquid ammonia is laid on with a rag or brush, which does the work rapidly and effectually.

To darken cherry, rub it over with nitric acid of 1.2 specific gravity, and after permitting it to stand for twelve hours, wash and dry thoroughly. Nitric acid gives a permanent yellow stain, which may be converted into dark brown by subsequent application of tincture of iodine.

A hot, concentrated solution of picric acid gives a very fine yellow effect. Aquafortis, diluted with three times its own weight of rain water, brushed over the wood, gives a more true yellow effect than the undiluted nitric acid (aquafortis).

A bright golden yellow stain is made by digesting one-half ounce of powdered madder for twelve hours in two ounces of sulphuric acid and then filtering through cloth. The articles to be stained should be immersed in the fluid for three or four days.

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How to Prepare Color, or Paint, that Will Not Crack or Peel Off Rubber Cloth of Carriage Tops.

Make a mixture of one gallon best body finishing varnish and one-quarter-pound yellow country beeswax that has been dissolved by heat (in a water bath) in one pint of pure spirits of turpentine. Before mixing the two, the varnish should be placed in a tin can which is also warmed up in hot water, so as to make the solution of beeswax and turpentine amalgamate more intimately with the varnish. Now break up two pounds of drop black, ground in japan or rubbing varnish with enough spirits of turpentine, then gradually, while constantly stirring, add the mixture of finishing varnish and beeswax solution. If this does not flow out well from under the brush, add more turpentine until it does. As a matter of course, before this preparation is applied the rubber must be well cleansed by sponging with soap and water, rinsed with clear water, dried with a chamois skin and allowed to dry thoroughly afterward. If any other color than black is desired, mix in a similar manner as that above given, changing proportions to suit the nature of pigment composing the color employed.

— 538 —

Size for Rough Plastered Wall that Will Prevent Water Colors from Spotting Out.

The best cheap size for plastered walls that are to be painted in water color is made as follows:

Dissolve in five gallons of boiling water twelve ounces of sal soda and four ounces of borax, then, when the crystals are fully dissolved, add, while stirring, one pound of window glass rosin that has been dissolved in eight ounces of benzine, boil all until the rosin is dissolved. Thin one pound of the resulting composition with three and three-fourths gallons of soft water and mix the solution so made with a solution made by dissolving two pounds of glue in four gallons soft water and boil the two solutions together for thirty minutes, then run through a paint strainer.

Or you may use so-called suction varnish or wall varnish, which is sold at a low price for this very purpose by many varnish makers. Soap and alum size is not the proper material for rough plastered walls and a coat of boiled linseed oil is preferable by far.

— 539 —

How to Make Aquarium Cement or Putty.

The best cement for this purpose has been used with success for many years at the Zoological Gardens, London, and consists of the following: One-half pint by measure each of finely powdered litharge, fine, white, dry sand and plaster of paris, and one gill of finely powdered rosin are intimately mixed with boiled linseed oil and some paste drier and beaten thoroughly into a putty-like mass, which is allowed to stand about four hours before it is used. But it must not be allowed to stand over twelve hours, as by that time it begins to lose strength. This putty will resist both fresh and salt water. It is best, however, not to use the tank or aquarium for two or three days.

Klein gives the following as a good cement for aquariums: Mix equal parts by measure of sublimed sulphur, pulverized sal ammoniac and finest iron filings with a strong boiled linseed oil, then add enough dry white lead to make an easy working putty. Still another formula is to take six parts by weight of boiled whiting, three parts by weight of plaster of paris, three parts by weight of dry white beach sand, three parts by weight of fine litharge, one part by weight of powdered rosin and mix these ingredients with best coach varnish. We, however, do not recommend the use of this last formula, as we cannot see the advantage of using rosin in connection with coach varnish.

— 540 —

Flowing on Varnish or Enamel Paints.

Flowing on is the opposite of brushing out, and means that the varnish or paint is to be applied in a heavy coat and not crossed or re-crossed more than is necessary, so as to give the material an opportunity to level itself to a mirror-like surface.

— 541 —

What Is Roughstuff and What Is It Used For?

Roughstuff is used by the carriage painter, the car painter and to some extent by those that paint and ornament very fine machinery. Its mission is to give an even, uniformly hard surface that may be rubbed down with pumice stone and water to a level on which the ornamenting color and finishing varnishes will stand out like a mirror. It is made in various ways, but here are a few of the most common formulas: Equal parts by weight of Reno's filler and keg white lead are mixed with enough quick rubbing varnish and coach japan, equal parts, to make a medium stiff paste, which is thinned with spirits of turpentine to brushing consistency. Or two pounds keg white lead and five pounds English filler are mixed with equal parts best rubbing varnish and coach japan to a stiff paste and thinned with turpentine for the brush.

— 542 —

Making Water Colors by the Painter.

It would be a waste of time and of little or no benefit to our readers to give formulas or describe the process of making water colors when they can be bought much cheaper from the manufacturer who prepares them on a large scale. Assuming that the painter has a mill in his shop, will he be able to buy his raw materials on a small scale as cheaply as the manufacturer, and how much labor and inconvenience must he put himself to until he can produce the product as fine as the color grinder, with his up-to-date mill? Most of the colors are in the pulp state at the color works and need not be dried, but can be put on the mills direct, making a saving in cost, while the painter is obliged to buy the color in the dry state, then to mix and soak it in water and finally grind it to impalpable fineness. Where is the economy?

— 543 —

Enamel Suitable for Interior Woodwork.

If the interior enamels offered by paint manufacturers do not give you the satisfaction desired, then purchase strictly pure French zinc ground in damar varnish, which any reputable paint house can supply you with, and beat the paste with a little turpentine to the consistency of a medium thick batter, then reduce it with sufficient white damar varnish to make it like a varnish of good body. This is for all gloss finish. Should you desire, however, to moss or hair the surface in order to obtain a velvety finish, you will have to use a high grade white enamel varnish, which is rather high in price. At all events, if you wish your enamel to work and look well, you must prepare your foundation coats accordingly.

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Repainting of a Dwelling and Roof on Which Paint Has Scaled Badly.

A house that had been painted over several times with different paints, had scaled so badly that the scales roll up in curls, especially on the roof.

The proper thing to do is to scrape off all the scales and loose paint and burn off the rest, wherever it can be done with safety to the house. We assume that the roof is laid in shingles and that you cannot well burn the paint off here. Scrape off all the loose paint and then go over the surface with raw linseed oil, which will loosen all the paint that would scale later on. When the raw oil has softened the old paint, scrape off all that will come off and allow the rest to remain there. When the raw oil has become well absorbed and hard, before applying the moss green, give a coat of pure white lead, tinted lead color with lampblack and thinned with raw linseed oil and a little japan, and rub it in well.

On this your moss green paint, if made well, will stand for years and no more scaling or rolling up will take place.

The fall of the year is the best for repainting, because the paint will have an opportunity to become firm before the next hot summer season is upon us again.

— 545 —

The Cause of the Pitting of Varnish.

A veteran in the varnish business describes pitting as presenting innumerable pinholes in varnished surfaces, and the causes as manifold. Change of the atmosphere from dry to damp; mixing of varnishes of different quality or different manufacture; excessive heat or excessive cold; varnishing over fillers, colors or varnish coats that are not hard enough, or over varnishes that sweat; varnishing when floors are excessively wet or in cold or damp shops or rooms; application of cold varnish on warm surfaces or vice versa, and last, but not least, application of varnish in shops that have insufficient ventilation. When a varnisher keeps his brushes in a mixture of oil and turpentine he may expect that his varnished surface will become spotted. Pitting or spotting may also be expected when varnish is used clean to the bottom of the package or when it has been exposed to very cold atmosphere and has not been kept in a warm room prior to use.

— 546 —

The Cause of Mold or Efflorescence on Brick Walls.

Moldy patches came out on brickwork having a northern exposure, that had been painted the year before.

There seems to be no reasonable doubt but that the brick work you refer to was either full of moisture before you painted it, or there is a leak in the roof, which allows moisture to get into the brick work back of your paint.

The soluble salts in the mortar or in the brick itself become dissolved by the moisture and must work their way out somehow, and as they are hardly liable to work out through the plaster within, they are bound to come out through the paint. It is but reasonable to assume that on a northern exposure, where the sun never strikes, the wall was damp previous to being painted. There is no real effective method, and the best that can be done is to scrape off the paint wherever mold or efflorescence is noted, and treat the surface to several washes of phos-

phate of lime solution or phosphoric acid preferably, or dilute with sulphuric acid, and, after rinsing and allowing the patches to dry out thoroughly, to repaint. This treatment will neutralize the soluble salts in cement or mortar as well as in brick.

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How Shingle Stains May Be Made With Creosote.

Very little experience is required to prepare or mix shingle stains, using creosote as a vehicle. Dry pigments, such as mineral red and brown, ocher (yellow or red), Vandyke brown, burnt or raw umber, burnt or raw sienna, lampblack, zinc white, etc., may be employed either singly or in combination as the staining material. The pigments must be in powdered form, impalpably fine and bone dry and are sprinkled into creosote oil while it is agitated by stirring. For dipping purposes less pigment is to be employed than when the stain is applied with the brush. A simple method of mixing the stains is to take oil paint of the requisite color, thin the paste as it should be for outside surface, then add as much creosote oil as there is paint and it is ready for use.

— 548 —

Bronzing Liquid for Exterior Work and Bronze that Will Not Tarnish.

The questioner had used banana oil, but it rubbed off. Something was wanted that could be used on a band wagon.

Your banana oil did not contain enough binding material. It is pear oil or amylacetate, in which is dissolved a small portion of celluloid which acts as a binder and hardener. No doubt the commercial article is sometimes sophisticated, which may be the reason that it did not give you the results desired. Dry bronzes, composed of copper, brass and tin, are very easily affected by exposure to the weather, and also by the nature of the size, which may act on the alloy, tending to greening or blacking off. Our advice is that you use as a size a mixture of one-third of a first class extra light hard oil finish or a highgrade extra pale coach varnish and two-thirds pure spirits of turpentine with French gold leaf bronze, using a camel's hair brush. Mix only very little at a time, because it dries up quickly.

Aluminum leaf bronze will do the work for silver effects. When striping or lettering in bronze, it is well to take the extra precaution of applying a coat of very thin white shellac varnish over the bronzed parts before applying the finishing varnish.

Should you be unable to obtain the French gold leaf bronze powder, you can prepare it yourself by grinding genuine gold leaf in a mortar with honey until all the leaves are broken up and minutely divided. Remove the mixture from the mortar with a spatula and stir up in a clean dish or basin with water, which will dissolve the honey. Leave the dish undisturbed until the gold subsides, pour off the liquid and repeat the operation until all the honey is washed out, collect the gold on a filter and allow to dry, when it is ready for use.

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Preparation of Sienna by Levigation and Calcination.

The raw sienna is ground in water on buhr stone mills into a series of floating tubs, the deposit in the tank nearest the mill or mills usually containing the sand or grit that is undesirable. The pigment in the farthest tanks is allowed to settle and the water drawn off. The settled portion is allowed to drain on muslin, stretched over large frames, and when nearly dry it is placed in a furnace or retort and calcined at low heat until it has acquired the desired color, when it is allowed to cool and the lumps are crushed by running them through a set of rollers or a pulverizing machine. When the material is naturally fine and free from grit, ordinary grinding is sufficient and levigation unnecessary, but in all cases the raw sienna earth should be powdered in order to make calcination uniform. For calcining sienna, almost any sort of furnace may be used, but the best results are obtained from muffle furnaces, and the heat should be a low red, which will usually convert the raw material into burnt sienna in from six to eight hours. By using a low red heat the product retains more tinting power than by employing a higher and quicker heat.

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Good Mixtures for Dipping Purposes for Articles of Hard Wood.

In order to make a good and durable job, your priming dip should consist of pure white lead, either left white or tinted with such oil colors as will give you the tint or effect desired. To do good work, make your priming dip by breaking up ten pounds of lead in oil, so-called keg lead, with one pint of liquid turpentine drier, allowing this to stand over night or at least a few hours, then thin to dipping consistency by adding gradually, while stirring, five pints of pure spirits of turpentine, which will give you a full gallon of a first-class priming dip that will dry in from eight to ten hours hard enough for handling and second coating. If required to be tinted, break up your oil colors in japan and thin the same with turpentine. Put both white and color through a paint strainer before using the dip, in order to prevent particles of skin from lodging on the dipped work. For cheap work the turpentine may be replaced with naphtha. For the second coat or finishing dip, it is not advisable to use pure lead alone, because the priming dip of pure lead is elastic enough to permit of a combination of lead and zinc to be employed. There are two ways to obtain good results. The best of these is to use equal parts of keg lead and pure zinc white in oil, breaking them up in a pale coach japan or liquid drier and thinning the soft paste so obtained with pure spirits of turpentine, so that this dip will dry with eggshell gloss or almost flat, when it may be finished with varnish. Here, too, the turpentine for thinning may be replaced with naphtha for the cheaper grade of work. Seven and one-half pounds of keg lead and an equal weight of zinc white in oil, one pint of coach japan and three pints of turpentine will make one gallon of this dip. Another method, which is more economical, because it will save the varnish coat, but not nearly so durable, is to grind in paint mill one part by weight of dry white lead and two

parts by weight of zinc white in equal parts of boiled linseed oil and gold size or coach japan to a medium paste with the required coloring matter, then thin the paste with enough pure spirits of turpentine to bring it to the consistency of thick cream and reduce with a like quantity, by measure, of a good mixing varnish. If it does not drip freely enough or does not produce a high enough gloss, add more varnish.

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Formula for Making Oil Gold Size—Also Gold Size for Burnished and Distemper Gilding.

Oil gold size can be made in many ways. For commercial purposes the simplest method is to place boiled linseed oil in a suitable pot and boil at a gentle heat to the point of ignition, then set fire to it and let it burn until it becomes thick and put on a cover to extinguish the flames. Strain through silk and thin to proper consistency with oil of turpentine. A little medium chrome yellow or yellow ocher, ground very fine in oil, should now be added.

Another somewhat quicker oil gold size is prepared by heating linseed oil to the boiling point and, under continual stirring, finely pulverized gum animi is added and the boiling continued until all the gum is dissolved. When the mixture has attained the consistency of thick molasses, which can be ascertained by taking out a sample every once in a while and dropping it on a piece of glass, it is strained through coarse cheesecloth. It should be thinned with oil of turpentine, so that it flows from the pencil, and a small quantity of finely ground chrome yellow or vermilion in oil may be added to give proper color.

Burnished gold size or gold size for distemper gilding is made by dissolving parchment or isinglass in water and adding yellow ocher that has been ground to the utmost fineness in water.

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Gilding a Dome With Gold Leaf—Best Size and Method of Laying the Leaf.

You should have stated what the dome to be gilded consists of, whether it is made of wood or metal, and if the latter, what does the metal consist of; in other words, is it iron, tin, copper or brass? To take the leaf well, the surface should be primed and the priming depends very much on the character of the material. If the surface of the dome is wood, apply several coats of paint, until a perfectly smooth surface is had, but let the last coat be flat, so that it may be sand-papered and that the size may hold well without crawling or wrinkling. For metal of any kind, cleanse well, then apply several coats or flat paint, rubbing down the last coat to a smooth finish with hair and pumice. Then apply fat oil gold size and when this has set up sufficiently, lay your leaf in the usual manner, but, to avoid loss from blowing away, use the patent gold leaf, now prepared for that purpose, which will save you the trouble of greasing the leaf, which had to be done by the painters of "ye olden" times. Lay your leaf from the book and burnish with a cotton wad. You can prepare your fat

oil gold size by using the oldest linseed oil you can find, mixing it with a trifle of medium chrome yellow that has been ground fine in oil, and if you wish to hasten its becoming tacky, add a tablespoonful of gold size japan to one-half pint of the oil. Good elastic gold size that will remain elastic for a century may be made by boiling one quart of raw linseed oil with one-half ounce of soda until the oil thickens into soft soap-like consistency under constant stirring.

When nearly cool, it is mixed with a similar quantity of raw linseed oil well aged and thinned with enough turpentine to make it flow nicely from brush or pencil. A trifle of chrome yellow is added for gold size, or a little white lead tinted with lampblack for aluminum leaf size.

— 553 —

Spreading Capacity of Shellac Varnish and Other Varnishes.

Shellac varnish will cover smooth, finished white pine 400 square feet to the gallon, first coat, and 500 square feet for each succeeding coat, while interior varnishes, such as furniture varnish or hard oil varnish, will spread over 350 to 400 square feet of surface on first coat, 500 square feet on second coat and close on 600 square feet for third coat per gallon. On hard wood that has been properly filled it will cover from 50 to 75 square feet more for each coat than on white wood or white pine that has not been treated with filler.

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How to Prepare Copper on Outside Work.

It is not very clear to us whether you wish to prepare copper to receive paint or to imitate copper with paint on baser metal. If you simply wish to know how to make oil paint adhere to copper or other metal, as, for instance, brass, we can recommend a wash with a solution of sulphate of copper, slightly acidulated with nitric acid, which will roughen the metal so that paint which is not too oily will adhere firmly and will not peel or powder off.

To make a copper paint, precipitate metallic copper out of any solution of a copper salt by introducing scrap iron into the liquid. After drying the precipitate, mix and grind it with linseed oil and japan.

To paint portions of the front of a building in imitation of antique copper or bronze, apply a ground color made from white lead, chrome yellow, burnt umber and Venetian red to resemble dirty copper, and have it nearly flat, then apply copper bronze mixed with good spar or outside varnish and thinned with turps. Then apply a glaze of best verdigris, ground fine in varnish and thinned with turpentine to dry with eggshell gloss, or, if you do not like the greenish effect, use raw umber, ground and thinned in similar manner. Before the glaze has an opportunity to set hard, wipe out the high lights, making a very pretty effect.

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Material for Making Stencils for Lettering on Freight Cars.

If you do not care to make your stencils out of sheet zinc, try a piece of opaque window shade cloth, which you can stretch and tack on to a

wooden frame of suitable size. You will find that this is much stronger and will not buckle. Give it a coat or two of shellac.

Stencils for car lettering may also be made by using two outer sheets of light manila drawing paper and an inner sheet of muslin, put together with flour paste and flattened between boards that are clamped together by means of hand screws. These stencils will last for years. Oil board, such as is used in copying presses, with cheese cloth fastened on one side by means of shellac, has also been recommended.

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Venetian Red Paint for Use on Shingle Roofs That Will Not Fade or Turn Black Under Severe Exposure.

Although many efforts have been made to produce such a paint as our correspondent desires, they have all met with failure. If oxide of iron paints fade it is due to the diluting mineral base that is used to cheapen them. If they turn white, it is due to inferior oil being employed in their makeup. If strong in oxide of iron and ground in and thinned with pure linseed oil and oil driers, they will invariably turn dark, because of the action of the oxide of iron on the oil. In the presence of moisture at night and strong exposure to sun in the daytime, such paints will alternately soften and harden, and these sudden changes tend to destroy their binding properties and allow mildew to obtain a hold.

We do not know of anything better than to thin down a paste Venetian red, bought from reputable manufacturers, with pure raw linseed oil and a turpentine drier, adding as much turpentine as it will permit, allowing the first coat to dry flat on the shingles, if new, and to apply a second coat as thin as possible that will stand out with semi-gloss. A shingle roof should look flat, but the sun and the moisture will soon destroy the gloss and the roof will look just right. This is the best advice we can impart.

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How to Obtain Verd Antique Effects.

The architects' specifications called for the grille work on the outside of windows and doors to receive two coats of graphite paint, the final finish to be verd antique.

There are two kinds of verd antique effects. One is a term given to a green incrustation on metal, such as brass or copper, which consists of hydrated dicarbonate of copper. The second is a mottled green, serpentine marble, also a green porphyry, called Oriental verd antique.

If the architect in specifying meant the first effect—that is, the imitation of incrustation or patina—the simplest method is to triturate carbonate of copper with sandarac varnish. The iron grill work is first coated with the required coats of graphite, which must not be too glossy, and one coat of dead flat black paint, over which the mixture of carbonate of copper and varnish is applied. When this has dried, it may be second coated in certain places, to make the antique effect more pronounced.

Should the effect desired be that of verd antique marble, the ground must be black, as before, and the grain colors white, yellow ocher and

bluish green. The tools required are camel's hair fitches, blender and sponge. Large flakes of white are scrambled in with the sponge and blended. Trace in the other tints in veins, large and heavy in irregular circles. Blend softly.

The grain colors should be ground in oil and thinned with part turpentine and the necessary drier. To do this work in proper style requires an expert grainer.

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How Many Colors Are in the Rainbow?

The rainbow is a spectrum of colors that is formed by the refraction of the sunlight during its passage through the drops of water in a shower of rain. There are seven positive colors named as constituting the spectrum, be it a rainbow or be it produced by a beam of white light passed through the edges of a triangular prism, and Sir Isaac Newton, the discoverer of this property of white light, named these colors as follows: Red, orange, yellow, green, blue, indigo and violet; but there is no distinctly marked line of division between these seven colors, as they pass insensibly into one another from red down.

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Best Method for Removing Smalts from Old Signs.

The best and most practical method for removing smalts from old signs is to take a hatchet with a rather blunt cutting edge, holding the handle with the left hand and the hammer end with the right hand, pushing the hatchet from you. This lends greater force to the workman and is not liable to dig into the wood. The use of corrugated rubbing brick and water is altogether too slow and unsatisfactory, while the use of potash, etc., will raise the grain of the wood.

— 560 —

Stains in Plastered Walls That Are to Be Coated with Kalsomine.

Certain new plastered walls are dry, but show stains all over. The specifications say no size of any kind is to be used on the walls, and provide for only one coat of kalsomine to make them an even and uniform white.

If the walls are stained, it is next to impossible to keep the stains back with one coat of kalsomine, at least we have never even attempted it. Of course, it depends very much on the nature of the stains and whether there is any dampness in the wall. A wall may appear dry and hard and yet there may be dampness behind the plaster. You might make your kalsomine a little richer in glue than usual; say use one pound of glue to fifteen pounds of whiting, instead of one pound glue to twenty pounds of whiting, or increase the proportion of glue even more, but the glue must be good and white, or you have no show whatever.

You might possibly succeed by making your kalsomine from freshly calcined plaster and white glue, thinned with hot water, because this will stand out whiter when it becomes dry than that made from whiting. In this case the plaster must be very finely powdered, or the job

will not be smooth enough. But success is not assured unless size is used, and a glue, soap and alum size is, next to hard oil finish, the best for the purpose. Half a pound of good white glue, half a pound of white soap and one pound alum is the proper proportions for such size, each article dissolved separately in hot water and mixed while still hot.

— 561 —

Painting on Silk, Satin, Shirting or Linen.

The principal object to be obtained in preparing the fabric is to take care that the stuff does not become too brittle from painting upon it, and this is prevented by using the colors as flat as possible, so that the material does not strike in the fabric too much. In order to stop the colors from coming through on the other side, a size made from four parts of gelatine and ten parts of water, with from ten to twenty drops of glycerine added to each quarter pint of the gelatine and water solution should be applied on shirting or linen over all the design, while on silk or satin only the outlines of the design should be sized. The size must be dry to the touch before painting is begun. Tube colors in oil are best suited for the purpose, and several applications are required to bring out the effect properly. The colors must be as free from oil as possible, especially on the first coat. To make the colors less oily, extract some of the oil from the color by placing it on blotting paper for a short time. Use brushes or pencils with bristles as short as possible, and trim these to suit. If any part of the painted surface should be matt, go over it with a good, pale coach varnish of the proper elasticity. For large surfaces it is best to draw as much of the oil from the colors as possible, and add to the color a little heavy painters' varnish and enough turpentine to make it flow freely from brush or pencil. For sizing silk or satin that is not exposed to dampness, one part of white of egg and two parts water will answer very well.

— 562 —

Practical Method of Painting on Velvet and Similar Fabrics.

There is a very simple method which can be handled in such a manner that neither fabric nor the painting will be injured. First trim a small fitch with a pair of scissors, so that the bristles are not over one-eighth of an inch in length; make it round at the point. Use oil colors in collapsible tubes and place the color on blotting paper, so that some of the oil may be soaked up and the color be quite stiff. Then, after having stamped your design on the velvet, dip your brush in the color and proceed to comb the nap of the velvet with it. The depth of color depends on the number of times you have applied the brush in the manner described, as the combing of the nap with the brush simply stains the nap and leaves it flexible and therefore more durable than by any other method.

— 563 —

Coating the Backs of Mirrors with Quicksilver.

This is a difficult operation, and requires a great deal of practice. Remove the old amalgam by rubbing it off with very fine powdered pumice and water, and rinse the glass thoroughly in clear water, and when dry rub with tissue paper. Lay a piece of tin foil (not lead foil) on a perfectly flat surface, and pour mercury over it to the depth of one-eighth of an inch. Slide the glass over it, so as to bring a new surface of amalgam against the glass, then leave it a while under pressure and set on edge to drain.

— 564 —

Formulas for Making Pale and Brown Japan Driers.

Formulas were wanted for white japan drier that will not make white paint dry out pink, and a brown japan that will dry paint when one gallon of the liquid is mixed with thirty gallons of paint.

Your proposition is a difficult one, if you wish one gallon of japan to dry thirty gallons of oil paint within twenty-four hours in all sorts of weather.

We will give you some formulas which you may try, but will not guarantee success. To make a pale or so-called white japan, fuse at a moderate temperature 100 pounds palest rosin, W. G. or W. W., with 10 pounds litharge and 5 pounds white sugar of lead, and do not let it become discolored to any extent. Then add four gallons of well-settled, clarified linseed oil and boil at low heat until the mass becomes stringy, and when a small sample is placed on a slab of glass it must become at once brittle and hard on cooling. Take from fire and thin with about twenty-five gallons pure spirits of turpentine.

In order to keep this drier from giving a pink effect to white paint, avoid the use of manganese in any form.

To make a strong brown japan, fuse at high temperature 100 pounds ordinary rosin with 15 pounds red lead, 15 pounds litharge, and 3 pounds finely powdered black manganese oxide and add 6 gallons of boiled linseed oil, previously heated, which mixture boil together until a sample taken will dry brittle on cooling when placed on a glass slab. Take from fire and when sufficiently cooled off, yet still warm and liquid, thin down with about 30 gallons of spirits of turpentine or equal turpentine and benzine, adding the turpentine first, so as to avoid too great a loss.

— 565 —

How Golden Oak Finish Is Made.

You must remember that you cannot produce a really good golden oak finish unless the wood you are staining is either white or red oak and has the proper grain. On these woods you use a good paste wood filler colored with burnt umber, then stain the wood with a mixture of, say, one pound burnt Turkey umber in oil and one pint of turpentine asphaltum varnish, thinned with one-half pint best brown japan and turpentine to the consistency of very thin varnish. Apply this to the wood with a bristle varnish brush and when the stain has set take

a cloth and wipe out the high lights and allow to dry, then varnish. Should you wish to imitate golden oak finish on close grained woods, you will have to give a ground of tinted lead, same as for dark oak graining, and fix the high lights with shellac varnish. The graining color is made from burnt umber and asphaltum varnish, with a little raw umber and a trifle of chrome yellow. The high lights that have been marked with shellac varnish are wiped out and the whole surface is combed. It requires a study of the natural oak and its grain to accomplish the work properly. The finishing coats of varnish give the final touch to the work, and if these are rubbed and polished some very fine and fanciful effects can be obtained even in imitations.

— 566 —

Putty for Light Woods That Are to Be Finished in the Natural.

For this kind of work the regular glazier's putty will not answer, as it cannot be colored to make clear tints. Use white lead putty, made by mixing and kneading three parts of finely sifted dry white lead and one part of bolted whiting with boiled linseed oil to a stiff mass, which is stained with a little raw sienna for pine lumber, yellow ochre for oak, raw and burnt sienna for cherry, burnt sienna for mahogany, burnt sienna and burnt umber for walnut, and raw umber for antique oak. With this the nailholes, etc., are puttied up, after the wood has been filled and before any varnish has been applied. Surplus putty is removed with the edge of the putty knife, taking care not to dig into the wood. To make a smooth job of puttying, go over it with a piece of fine sandpaper. For a hurried job, add some japan to the boiled linseed oil when preparing the putty.

— 567 —

Blistering and Checkering of Varnish on Boats.

Some boats that had been varnished, blistered, checked and turned white after having been in the water but a few days.

The best thing you can do, if you desire to refinish the boats in the natural, is to procure a good varnish remover and give the boats a fair opportunity to dry out well after you have removed all of the old varnish. Then get your supply house to furnish you with a varnish that they can guarantee will stand water without turning white, and apply several coats of it, permitting each coat to thoroughly dry before applying another. Your failure was evidently due either to the boats being water logged or to the varnish being of too inferior a quality for the purpose.

Should you, however, desire to paint the boats, we would advise you to burn off the old varnish and use a paint with a lead and zinc basis and hold it flat, if you wish to finish with varnish.

— 568 —

Japans and Driers for Various Purposes.

For zinc white in poppyseed oil we would suggest the use of white coach japan, if the rooms are to be done in gloss finish, but if the finish is to be flat we should recommend the use of paste drier. For the

drying of oil paints to be used on the exterior of buildings and for porch floors, in fact for all outside work, we would suggest the use of a pure oil drier that is free from rosin or gum of any kind, and that does not contain benzine. As a drier for oil paints to be used on interior floors, a good, strong brown turpentine japan will give the best satisfaction.

— 569 —

Is the Quality of Linseed Oil Impaired When Exposed to Freezing Temperatures?

Yes, temporarily, but not permanently. The point at which pure linseed oil freezes is minus 27.5 deg. C.=18 deg. below zero F. It is apt to become turbid, however, when exposed to a temperature below the freezing point of water, viz., 32 deg. F. In any state between this point and that of its own freezing point, linseed oil, raw or boiled, is not in good condition to be used as a thinner for paint, and should not be so employed without being warmed up to a temperature of between 60 and 75 deg. F., otherwise it will not mix well and make the paint appear seedy or grainy.

Even if the oil has become congealed by frigid temperatures it has lost none of its valuable properties when warmed up to a normal temperature, so long as it was pure and fairly free from foots and moisture originally.

— 570 —

Blistering of Oil Paint After Repeatedly Burning Off and Repainting.

A New Jersey painter had a queer experience with the blistering of certain portions of the surface on the same dwelling. He first painted the house in 1888 with pure lead, French ocher, linseed oil, some turps and a little japan, giving the job three coats. The paint wore well for five and one-half years, with the exception of a little blistering on south side of house under water tables, corner boards and a few weatherboards. At that time he burned off the paint and sandpapered the surface, giving it two coats of practically the same paint as he did in the first instance. In 1899 he was obliged to burn off blistered paint at the same places as before, only a little more extended. Two months after repainting, blistering began again in the same spots and also on several other parts of the house. In the summer of 1902, he burned off the paint and again repainted and the blistering became worse than ever. On cutting some of the blisters, fine yellow streaks were found underneath.

From the detailed description given of the mixing of the various coats of paint, and the various brands used, we are satisfied that the material was good and that the blistering was not caused by applying the paint too stout, as is sometimes the case when oil paint blisters afterward. Nor do we believe that it is caused by sap in the wood, as the fine yellow streaks under the blisters may be caused by rusty nails. We are rather inclined to believe that it is caused by moisture behind the weather boards and corner boards, and the moisture may find its way there from imperfection in the roof or from dampness in the ground or foundation. A rigid examination of the roof and gutters,

probably the tearing away of a portion of the corner boards and weather boards may reveal the cause of the trouble, for it is hardly probable that after so many burnings off of paint sap would be still retained.

— 571 —

Spots on Varnished Surface Caused by Steam—How to Remove the Same.

We do not know of any better method than to rub over the spots with French chalk moistened with grain alcohol until they lose the white color, then clean off with tepid water and dry with a silken cloth or chamois skin. After this, polish with rotten stone and sweet oil. If the spots are caused only by the condensation of the steam, this will remedy the defects, but should the varnish be blistered then it will have to be removed and the work done anew from the wood up.

— 572 —

How Cast Iron and Polished Steel May Be Bronzed.

After thorough cleansing of the cast iron articles, immerse them over night in a saturated solution of sulphate of copper and they will acquire that color. When coated, they must be well washed in clear water. To bronze polished steel put into a large enough bottle one quart methylated spirits, eight ounces gum shellac and one ounce gum benzoin. Set the bottle in a warm place and shake the bottle occasionally. When dissolved, decant the clear liquid and strain the balance. Mix the varnish to suit with finely powdered dry bronze green, varying the color to suit with yellow ocher and lampblack. Apply the mixture, after warming the articles, in two coats.

— 573 —

Slow Drying of Venetian Red After Grinding in Pure Linseed Oil.

Manufacturers of colors in oil, etc., through experience gained by long practice and through study of the action of pigments on linseed oil, employ very little raw linseed oil in grinding colors and select raw, bleached, refined or boiled linseed oil, as suits the nature of the pigment. For instance, burnt Turkey umber should be ground in raw linseed oil, because this pigment is in itself an active drier from its large percentage of oxide of manganese, while bone black, which does not exert any drying influence on the oil, should be ground in boiled linseed oil. Red oxides of iron and Venetian reds exert no influence whatever upon the drying action of linseed oil, and under certain conditions, such as dampness, when being mixed for grinding, these pigments are very apt to retard the drying quality of oil.

There are, of course, other conditions, such as moisture or impurities in raw linseed oil, that will delay the drying of colors. You can overcome the defect mentioned by selecting either a strong drying boiled linseed oil or well settled raw linseed oil, free from foots and moisture, to which you can add, say, 5 per cent. of a good oil drier for grinding your Venetian red, but always see that your pigment is as nearly bone dry as it can possibly be. As you do not grind for

the trade and do not put up large quantities for stock, you can well afford to add some driers to your raw linseed oil for grinding inert or slow drying pigments.

— 574 —

Will Plastering Inside of a House Make Paint Peel on the Outside?

This depends very much on how long the outside has been painted, and on the material it has been painted with and how the timber is affected by the wet plaster. There is hardly any doubt but that the plastering had something to do with the throwing off of the paint. Blistering and peeling of paint can always be traced to moisture underneath and the action of the sun upon it.

— 575 —

How to Finish Red Birch with Best Results.

Paste filler may be used on black or red birch, but it is not an absolute necessity, as it is rather close grained. However, many wood finishers prefer to use paste filler, especially when the wood has been stained to imitate black walnut or mahogany. In such case a light paste filler is stained to suit and applied, instead of shellac. Two coats of shellac varnish without using a filler will bring the surface into first-class condition for a good polish. For a first-class job, stain the wood to suit the taste, give two coats of shellac varnish and finish with good interior or cabinet rubbing and polish.

— 576 —

Pyrographing on Wood and Leather.

The process referred to is termed pyrography, and the work itself pyrographing. In practice, it is done by stamping the designs on wood or leather and burning in the outlines with needles or tools of various shapes, heated by electricity, while the amateur shapes pieces of steel wire to suit the work in hand, heating the same in the fire or gas furnace. A little genius, combined with practice, enables the amateur to turn out some pretty work in pyrography.

— 577 —

Clean Cut Stenciling in Sign Work.

A sign painter had trouble in stenciling from the colors working in under the edges of the letters and making rough or blurred work. Paper stencils were used, shellacked on both sides and hinged on frames, so that one fills the breaks left by the other. The colors were used quite thick and applied with a large brush.

Your method appears to be the proper one, paper stencils shellacked on both sides being best for the purpose. The letters, however, must be clean cut and well coated with shellac varnish and the paper strong and stout. But we think that you used your colors too oily and either stippled or worked them too forcibly. The best colors for this stencil work are those ground in japan, or at least ground in equal japan and turps, thinned with turps, but held fairly stout and applied with a No. 8-o brush with a rotary motion, not stippling or rubbing in hard.

— 578 —

Rosewood and Mahogany Graining Color in Distemper and Ground for Same.

The ground for mahogany should be made by mixing yellow ocher and Venetian red, ground very fine in oil and thinned with turpentine, adding sufficient drier. It should dry flat and be applied thinly with flat bristle brushes, so as not to show brush marks, which are very aggravating to the grainer. Three thin coats are none too much for new wood, and far better than two stout coats. For rosewood, the ground should be made of medium or orange chrome yellow and dark Venetian red. Indian red should not be used, as the ground made with this pigment is too dull.

As to graining colors in distemper, the grainers to the trade usually buy the various colors in water as suits their requirements. The water or distemper colors used in mahogany are burnt sienna and Vandyke brown, the latter being used to put in the darker veins. If the sienna is not rich enough, some crimson lake may be added.

For rosewood, the colors are Vandyke brown, ivory black and rose pink, the basis of the color is Vandyke brown mixed with a little ivory black, the rose pink and the ivory black are mixed separately and streaked through the base color, then carefully blended. All of the colors can be had, ground finely in water.

— 579 —

How to Finish Oak in the Natural When High Polish Is Desired.

The interior oak woodwork of a dwelling had been filled with paste filler and was to be varnished and polished.

The filled surface should be first gone over with No. 1 or No. $\frac{1}{2}$ sandpaper, so that all excess of filler is removed. This done, the woodwork in the room, as well as the floor, must be dusted, and the floor mopped up with a damp cloth, while the woodwork that is to be varnished is gone over with a damp chamois skin, in order to remove all remaining traces of dust, so that they cannot settle elsewhere in the room, as is the case in dusting. Now a coat of white shellac varnish is applied, so as to seal up all pores in the wood that have not been perfectly sealed up by the filler, which will save two coats of rubbing varnish. This coat of shellac varnish should be allowed to stand about seven or eight hours, then lightly sandpaper with No. 0 sandpaper, and the surface dusted as before. On this, two coats of a first-class inside rubbing varnish should be sufficient to produce a good surface for rubbing and polishing. Twenty-four hours between coats must be allowed, and the second coat should stand from forty-eight to seventy-two hours before the rubbing is proceeded with. The temperature of the room or rooms should not be below 70 deg. F. during the operation. The material necessary for rubbing are powdered pumice stone O or F, water or rubbing oil and rubbing felt. The rubbing felt, which comes in thickness from one-fourth inch to two inches, is cut into pads of three by four inches (and for use on interior woodwork the half-inch thickness is best). It is dipped into the water or the oil and then into the powdered pumice and passed over the surface with the grain,

bearing lightly when nearing the ends or on edges of moldings, so as not to rub through to the wood. When rubbing oil, which is a petroleum product, is used, the oil and pumice must be removed quickly from the surface, so as not to allow it to soak into the varnish and soften it. When water is being employed, it does not matter so much as to the length of time when the pumice is removed. To ascertain when the surface has been sufficiently rubbed, wipe off a portion of the pumice and oil or water with a stroke of the palm of the hand, and if the pitted appearance of the varnish has vanished it may be taken for granted that the job is completed. When rubbing with water, it is best to clean off with clear water and sponge, using a chamois skin to wipe dry, but in oil rubbing soft cotton waste or soft cotton wadding is best. To polish this dead finish there are two ways, the quickest method being to take a handful of raw cotton, dip it into a mixture of equal parts of olive oil and alcohol and rub the job with a rotary motion until the desired luster is obtained. The slower method is to apply a coat of flowing cabinet varnish, giving it seventy-two hours' time, then rub with flower of pumice and water, wipe up carefully and polish with rotten stone and sweet oil, using chamois skin or silk cloth.

— 580 —

Cement Size or Wash for the Exterior of Brick, Concrete or Stone Walls.

The cement is mixed with water, to which is added a portion of lime water and salt. The proper proportions are: One pint of lime water to seven pints of soft water and two ounces of salt. Enough cement is stirred in to make a paint of such consistency that it may be spread conveniently with a wall brush. If coloring be desired, add Venetian red in powdered form for red, mineral brown for brown, yellow ochre for buff and whiting for gray or slate color. Very good for new or damp walls.

See also No. 608.

— 581 —

How to Stain a Violin.

The staining and varnishing of violins is a special art and requires expert knowledge, if the tone of the wood is to be preserved. The wood must be stained before the varnish is applied and the stain should be made from camwood, logwood or eosin for red, for yellow from annato, aloes, gamboge or turmeric, using alcohol and water as the medium. By mixing red and yellow in various proportions, intermediate effects may be obtained in the staining. The coloring matter is boiled in water and when cool the liquid is strained and a little alcohol added to keep it in good condition. The stain is applied, allowed to set up and then wiped out with a soft cloth until the proper effect is had. If not deep enough, a second application is given. Before applying the varnish, the stained surface is gone over with the very finest sandpaper. The varnish should be a spirit varnish, made by dissolving 4 ounces of gum sandarac, 2 ounces pale gum shellac, 1 ounce gum mastic and 2 ounces benzoe resin in 32 ounces of 95 per cent.

grain alcohol, to which solution, when complete, 2 ounces clear Venice turpentine is added to make it flow from the brush freely. To make an extra fine finish, each coat of varnish is rubbed lightly with flour of pumice and water. Three light coats of varnish are required until a surface fit for polishing is obtained. The last coat of varnish is polished with rotten stone and sweet oil and finally by rubbing with the palm of the hand.

— 582 —

Gilding on Glass and the Effect of Moisture.

The glass of a hall door was gilded in the early fall. It stood all right till cold, damp weather came on, when it began to sweat, which caused the leaf to loosen its hold on the glass, the moisture apparently working under the edges of the letters. A thick asphaltum was used for backing, applying two coats. Gum arabic size was used.

We believe from your description that your backing did not cover the edges of the letters sufficiently to keep out the moisture. The thick asphaltum you employed is as good an article as can be had in that line, yet it might be better if under the conditions you name a mixture of lampblack and best grade of coach varnish had been employed, as this is known as a better backing than asphaltum for gilding on glass exposed to much sweating or to freezing. As for the size for gilding on glass. If your leaf came out spotted and cloudy with the gum arabic size the fault was probably in your not burnishing the leaf enough after the first layer. This should be done with refined cotton when dry, and a second coat of leaf laid, same as the first. When dry it should be gone over again with cotton lightly and then repeatedly washed with the sizing.

— 583 —

Water Stain to Imitate Mahogany on Cherry or Birch Wood.

The cheapest stain is made from Bismarck brown, and is made by dissolving two ounces of the powder in one gallon of boiling hot water and allowing it to cool, when it is ready for use. A stronger and redder stain is made by boiling a quantity of logwood chips in twice its bulk of water for two hours, then strain and add a small quantity of chloride of tin until it is red enough. Apply two coats.

A very brilliant rich stain is obtained by boiling 8 ounces of madder and 2 ounces logwood chips in 4 quarts of water. Brush this over the wood while hot. When dry, wash over with a solution of two drams of pearl ash in one quart of water.

— 584 —

Hanging Tapestry and Burlap for Wall Decorations and How to Treat Hard Walls for the Same.

Hard finished walls are glue sized to receive burlap or tapestry, using one pound of good glue to six quarts of water. Any practical paper hanger that knows how to handle an edge knife can butt the edges like veneering. A true joint will remain so and will not open. Use a good, stiff paste, which is improved by adding two tablespoons-

ful of Venice turpentine to a pail full of the paste while warm. If cold, take some of the paste, warm it, stir in the Venice turpentine and then add it to the cold paste. Paste the edges well, roll down the joints with care and immediately sponge off with clean water, so that no trace of paste is left on the surface. The goods being shrunk in their manufacture, they must not be stretched, but pressed to a tight joint only, and it is only necessary to fill in the larger cracks in walls before hanging. Uneven edges and projections in the walls must be sandpapered or scraped off.

No preparation is required after the goods are pasted on the wall, and they are ready for coloring, when so required, as soon as the paste is dry. Should the wall be damp, give it a strong solution of hot alum and water, one pound of alum to a quart of water. When dry, dust the crystallized alum off the surface, then apply the glue size and proceed as with a perfectly dry wall.

— 585 —

Enameling or China Glossing Interior Work.

A painter states that his method of doing enamel white or China gloss finish on interior woodwork is to prime with pure white lead and oil with some turpentine, following this with two coats of lead in oil thinned with turps, then two or three coats white enamel finish or zinc white ground in damar varnish and thinned with damar varnish. Some manufacturers of enamel paints have told him their goods should be used for each and every coat.

Do not allow yourself to be led astray by the claims of some over-anxious paint drummer who, by the anxiety to sell a few gallons of enamel paint, will undermine unknowingly the reputation of their house. You cannot make a good, durable job of enameling or china glossing on new or old work, excepting by the method which you yourself describe, though that method can be modified to some extent.

Enamel or china gloss white cannot be applied successfully without a proper foundation, for it will require too many coats to cover and will crack every time, unless applied over a proper priming and under-coating. The best method for woodwork is to give a priming of pure lead, thinned with equal parts of raw oil and turps, adding a trifle pale japan. Second coat pure lead, thinned with turps and a little pale japan only. Third coat French zinc white in oil, thinned with turps and some pale japan or paste drier. Sandpaper smooth to efface all brush marks, then dust carefully and apply first coat of enamel or zinc white ground in damar, thinned with damar varnish. Let this stand for a few days, then moss down with pumice and water. Clean off thoroughly with clear water and when dry apply a flowing coat of enamel white or china gloss, as above. This finish may be allowed to remain in full gloss or rubbed down to a dead finish with flour of pumice or rotten stone and water, as desired. For smooth plastered walls, prime with a coat of pure lead in oil, thinning with two parts raw linseed oil and one part turps. Second coat with pure lead in oil, thinned with equal parts of raw oil and turpentine, adding a little drier.

Third coat with equal parts pure lead and zinc white in oil, thinned with turps only, adding some pale japan.

When the price paid for the work will permit, a fourth coat, to consist of French zinc white in oil, thinned with turpentine, to which pale drier is added, is advised, but not actually required. Before applying the enamel in either case, the surface should be sandpapered. Next one coat of enamel or china gloss should be applied, well crossed and recrossed, and this followed by a flowing coat of the same material.

— 586 —

How to Make Wall Paper Stick on Newly Plastered Walls that Have Been Frozen.

When newly plastered walls have been so badly frozen that a powder appears on the surface like new plaster, which can be brushed off with the hand or broom, and in other places falls off in flakes, it is almost an impossibility to make the paper stick, from the fact that you are working on a loose surface. The only sure way is to remove the white coating and replaster. There are some other methods, as follows:

First size the wall with any of the following sizes; the first and second are most satisfactory:

Equal parts of dark sugar, molasses, glue and water.

Equal parts of alum, glue and sugar and water.

Equal parts of vinegar, glue and water.

Equal parts of glue, paste and water.

Next the wall should be lined, using wall paper, newspapers or muslin. Newspapers and muslin give the best results. The newspapers are to be pasted the same as wall paper (first sizing the walls), and after hanging use paste brush in the same manner that a pouncing brush is used. For the muslin, paste the wall and use paste brush the same as a hanging brush.

— 587 —

How to Mix Color for Graining in Imitation of Light Oak.

For graining in oil, mix raw Italian sienna in oil, a trifle of raw Turkey umber, also ground fine in oil and a small portion of bolted whiting with boiled linseed oil, adding a small portion of liquid drier. The whiting is added to keep the color from running together after combing. For dark oak, a trifle of burnt umber or burnt sienna may be added to the above, according to the effect desired. Sometimes oak graining is glazed with asphaltum, wiping out large blazes of lights, and dark spots are put in with a sash tool. For this purpose the asphaltum is dissolved in spirits of turpentine and a little boiled linseed oil added to prevent quick setting.

— 588 —

Coating for Oil Skins, Such As Are Worn by Seamen and Fishermen.

To make seamen's oil skins fine drilled calico is dipped into bullock's blood and dried thoroughly in a current of air; then 2 or 3 coats of raw linseed oil are applied by dipping or brushing and allowing each coat to dry thoroughly before applying another. The oil must be prepared by adding one ounce of powdered litharge to each pint of the oil, stir-

ring it occasionally, and allowing to settle after 24 hours, then decanting the oil from the sediment of litharge. The drying should be accomplished under a shed, where there is a good current of air, but where the cloth is protected from the rays of the sun and from rain. For yellow goods a little medium chrome yellow ground in oil or French ocher may be added to the oil; for black goods, lampblack in oil is the best coloring agent.

To waterproof fishermen's coats of linen or muslin make a stout paint of yellow ocher for yellow or of lampblack for black, using these colors ground in oil, thinning with pure boiled linseed oil only and add to each quart of the paint one ounce of brown soap that has been dissolved by moderate heat in some of the oil used for thinning. Lay the goods on a table and apply the paint with a stiff brush, rubbing it in well; then hang the cloth up to dry in the most airy place at your command. If it is more convenient, do not put the soap into the oil or paint, but in painting take the brown soap in your left hand and every time the brush is to be refilled with paint rub it first over the soap. This method is troublesome, but the result is quite gratifying. Two coatings are necessary.

A simpler and cheaper method of waterproofing canvas or muslin, linen, etc., is to dissolve 4 ounces of yellow soap in 6 pints of water by boiling, then stirring into the solution, while still on the fire, one gallon of boiled linseed oil, and when well mixed and limpid, it is taken from the fire and allowed to cool. When cold one pint of gold size is added. This preparation may be colored with chrome yellow for yellow and lampblack for black.

— 589 —

Indelible Crayon for Lettering on Cloth or Muslin Without Sizing.

There are crayons made for marking on glass, which would also serve your purpose, and we have no doubt that you can obtain the right kind in one of the large stores dealing in drawing materials or artists' supplies. Crayons are usually made from pipe clay and fine chalk, colored to suit, mixed with pale or sweet ale and a bit of fish glue, but these will rub or wash off in contact with water. To render them indelible wax or wax and soap is used with color, but the pipe clay and chalk are omitted.

— 590 —

Probable Cause of Softening of Letters Painted on Glass.

Some letters were painted on the inside of a glass door, the entrance to a telephone stock and construction room, in which soft coal is burned in a furnace, and in which room the chemicals used in batteries emit vapors. When the letters, which were painted with white lead, oil, turps and a little japan, were finished, they were firm and clean cut, but after being on a week they appeared wasted and transparent, and the edges had wrinkled and become irregular, and the paint, though apparently firm on the glass, chalked or powdered when rubbed hard with the finger. The letters applied on other doors in the building were all right, although the same paint was used.

We would certainly advise you to put your letters on the outside this time and use a little good varnish in place of the oil in mixing your color, because we think you did not have sufficient binder under the conditions in that room. There is no doubt that the sulphur gases from the furnace, in connection with the vapors from the chemicals used in the batteries, were the chief cause of the trouble and affected your binder, as well as the white lead. In chemical laboratories lead paints are not used, for the very reason you have mentioned as the probable cause of the trouble. Had you used zinc white instead of keg lead, and a good varnish in place of oil, the paint would hardly have failed as it did.

— 591 —

Black for Imitation of Ebony.

A black more intense than drop black toned up with Prussian blue was desired, in order to make a stain in imitation of ebony.

Gas carbon black is the strongest of all insoluble blacks, but its tone is too brownish for a good imitation of ebony. There are, however, aniline blacks, known to the trade as oil blacks because soluble in oils, and one of these will suit your purpose best without doubt. Ask your supply house to obtain samples of such for you, stating with what mediums you wish to use them. They are fairly permanent and well suited for the work you mention.

— 592 —

Substitute for Gutta Percha for Insulating.

We do not know where a good substitute for gutta percha may be procured, but can recommend the following composition as being a good insulator and considerably cheaper than the pure article:

Eighteen parts by weight of pitch, 9 parts by weight of calcium hydrate (slaked lime), 24 parts by weight of pure gutta percha.

For the pitch, coal tar may be substituted, and in either case the solvent used for the pure gutta percha may be used. A good composition for insulating may be made of one part Swedish tar, one part rosin and three parts of gutta percha, all by weight.

— 593 —

Tenacious Paint for Sheet Metal.

Paint made in the proper way and baked on thoroughly will not crack or peel off from sheet iron or sheet steel when the metal is bent. Such a paint is best made from colors that are ground fine in paste form in pure boiled linseed oil and reduced to liquid form with a good, elastic baking varnish, which is applied in a flowing coat and immediately, before it has time to set too hard, placed into the baking apparatus. It must be baked at as high a temperature as the color will stand without change.

— 594 —

Green Filler for Natural Oak and Green Glaze for Oak Graining.

The most durable green glaze is made from French verdigris, ground to the utmost degree of fineness in varnish and thinned with varnish for application. If there is no haste about drying, it may be used, ground in oil and thinned with oil and the necessary driers. Should the tone of verdigris be too bluish, a mixture of verdigris and yellow lake will give a very rich green glaze of the sap green tone.

As to a green filler for oak, any good grade of light paste wood filler may be stained with terra verte or green earth, chrome green being too opaque, or verdigris may be used, very little being required. Malachite, the natural mineral green, is not to be had readily, and the aniline color sold under that name is not fast to light. To make a green stain for natural oak, one that will not fade on being exposed to strong light, and will be inexpensive, we should recommend the use of chemically pure chrome green, toned with a strong raw Italian sienna of yellow tone and light gravity. Very little coloring matter is required for such a stain, and, though more costly than one made of aniline dye, it outlasts the latter fifty to one. We cannot give proportions, which depend entirely on the strength of the material and the effect desired.

— 595 —

Black Enamel for Stove Pipes and Similar Sheet Iron Work.

Any good asphaltum varnish, free from admixture with rosin, and with as little linseed oil as elasticity will permit, will suit the purpose. If rosin is introduced in stove pipe enamel, it will blister from the effect of the heat. Fuse in an iron kettle 100 lbs. of best Cuban asphaltum with 6 gallons boiled linseed oil, that has been boiled previously with 5 per cent. lead oxide, take from fire, and, when partially cooled, thin down with 24 gallons spirits of turpentine. For a second grade use the same quantity of asphaltum and linseed oil, but thin with 8 gallons turpentine and 16 gallons deodorized naphtha of 63 deg. Be, adding the turpentine first to prevent too great a loss by evaporation through heat. If the brown-black tone of the asphaltum is undesirable some varnish makers' black may be substituted for part of the asphaltum.

— 596 —

Graining Caskets of Whitewood in Imitation of Rosewood.

To begin with, close grained wood, like whitewood, is best for imitation of rosewood. The tools required are a flat brush, blender, fitches, camel's hair pencil and sponge. The wood is first primed with white lead, that is strongly tinted with Indian red, tinted with oil, turps and japan, so as to dry semi-flat. The ground—that is, the next coat over the priming—should be drop black, so mixed as to dry with egg-shell gloss. It is best to use it ground in japan and thinned with turpentine and a little varnish. On this, when dry, spread the graining color, which consists of rose pink and drop black, and may be in oil or in japan, thinned so as to work out freely and not run together on wiping out. Wipe out with the sponge or flat brush. Put in the grains

with the top grainer and pencils. Glaze with a mixture of rose pink and asphaltum, and wipe out knots or shadows to suit the fancy. When the surface has become hard enough, apply a coat of hard drying rubbing varnish, and rub down with pumice and water, wipe up and allow to dry thoroughly, then give a second coat of rubbing varnish and rub down again with pumice and water. When this is thoroughly cleaned up and wiped with chamois skin it is time to stripe, gild or otherwise ornament the casket, then carefully wipe and dust, then give a flowing coat of casket varnish and allow to dry hard in a closed, dust-free room. The glazing cannot be done, as you would have it, after striping or gilding; it must be done before any varnish even is applied.

— 597 —

Preparing a Ceiling of Yellow Pine Previous to Painting.

We would say that the ceiling should have one thin coat of shellac varnish, and that white shellac is best, if the ceiling is to be painted white or in a light tint. While, as a rule, the killing of sap is not essential where the sun does not strike the surface, it is a wise precaution to hold back the sap with a coat of shellac, especially when the paint is to be in flat finish. It will give more smoothness and uniformity to the paint, acting as a filler.

— 598 —

Imitating Birch by Staining Pine and Spruce.

We think you will find it very difficult to closely imitate on any pine or spruce timber the appearance or color of birchwood with an oil stain or any other kind of stain. Black birch, if that is the veneering you have in view, closely resembles wild cherry in color, and differs materially in growth from pine and spruce. Unless the work is very poorly paid, ignore liquid glue, which is probably all right for plastered work but not for wainscoting and door casings or window frames, which may be subject to moisture, and use varnish instead, to which add a trifle burnt sienna, a trifle raw sienna and a little burnt umber. Try it on a testing board first, and keep on till you succeed.

— 599 —

The Cause of Paint Peeling from Putty.

A painter puts the glass into the sash one day and paints the next; but when the sash is hung, and he starts to finish, he often finds the paint peeled from the putty, especially at the bottom of the sash. He states that he buys the best materials he can find on the market.

Your trouble is due to expansion and contraction. Ordinary or glazier's putty, which is composed of whiting (chalk) and linseed oil, does not dry hard enough in twenty-four hours to admit of being painted with oil paint that usually contains enough japan to dry in twelve hours, superficially at least. Many commercial grades of glazier's putty contain but little or no linseed oil, but are made with the

so-called putty oil (a deodorized mineral oil), and will not dry for a week. If you wish your putty to dry in twenty-four hours you had better mix enough dry white lead with it to harden it more quickly, or wait until the putty is hard before you apply your paint.

— 600 —

Rubbing with Pumice and Oil or Pumice and Water.

Rubbing with pumice and oil makes polishing more easy than rubbing with pumice and water. But the latter plan is surest, when the operator is working with varnish, whose drying and hardening properties he is not thoroughly acquainted with, or if the operator is a beginner in that line of the trade. If the oil and pumice are allowed to remain on the rubbed surface too long, the varnish is liable to become soft, and a ruined surface is the result. On the other hand, water tends to harden varnish, that may have a slight tendency to tackiness, and the work can be proceeded with more quickly.

— 601 —

Cause of White Lead and Oil Thickening After Being Mixed Ready for Use.

In each of the following mixtures the paint thickened after being mixed ready for use and looked like chilled kalsomine and would not cover:

1. White lead and oil only.
2. White lead, oil and a fair quantity of japan.
3. White lead, oil and varnish.
4. White lead, raw oil and patent dryer.

From your description, we should judge that you got hold of a batch of the so-called pulp ground keg lead, which was imperfectly treated—that is, the water was not thoroughly separated or eliminated from the lead during the process of mixing the pulp lead with the oil. We will not say so positively, because we do not know for certain whether the brand you mention is manipulated that way, but we have good reasons for the belief that such is the case. If we are correct, the explanation is very simple; the moisture still present in such lead will bring about an emulsion of the oil, which causes the thickening after thinning for use, and loss of body. There is, however, still another possible reason, and that is an excess of hydroxide in the composition of that particular batch of white lead, which also tends to a thickening, livering or pudding up of the paint, no matter how it may be mixed. If you have any of the white lead on hand from the identical package that is not yet thinned, we would suggest to you the following test: Procure a blowpipe and a piece of soft willow charcoal, dig into the latter a small cavity, into which you place a little of the white lead (about the size of a pepper corn), and with the aid of the flame of an alcohol lamp or a gas burner direct the blast from the blowpipe on the lead, and if the latter splutters strongly when the blast first touches it, you may be sure that there is moisture present. White lead ground from the dry material may splutter very slightly from the burning of the linseed oil, but will not do it to the extent of the pulp ground article.

— 602 —

Water Stain to Produce the Weathered Effect on Oak.

Weathered oak is the effect given the wood by exposure to the elements, and it is only necessary to bring about a similar effect more quickly by artificial means. Water color stains do not penetrate deep enough into the wood to make the effect strong enough, hence solutions of other material than color are being employed for the purpose. Aqua ammonia alone, applied with a rag or brush repeatedly, will darken the color of oak to a weathered effect, but is not very desirable, because of its tendency to raise the grain. Bichromate of potash, dissolved in cold water, applied in a like manner, until the desired depth is obtained, will serve the purpose. These washes or solutions, however, do not give the dark, almost black, effect that is at the present time expected for weathered oak, and in order to produce this, 4 oz. of logwood chips and 3 oz. of green copperas should be boiled together in 2 quarts of water for 40 minutes and the solution applied hot. When this has dried, it should be gone over with a wash made from 4 oz. steel filings and one pint of strong vinegar. The steel filings are previously put into the vinegar and allowed to stand for several days. This will penetrate into the wood deeply, and the stain will be permanent.

Picture frame manufacturers use a quick-drying stain, made from aniline blacks, that are soluble in wood spirit or amylacetate, and add wood alcohol shellac as a binder.

— 603 —

Painting a Hearse in Black Finish.

If the hearse be a new one, sandpaper smooth and dust off thoroughly every part of the body and running gears as well. Mix pure white lead in oil (keg lead) with lamp black to dark lead color and thin with equal parts raw oil and turpentine, adding one tablespoonful of coach japan to each quart of this if you wish to hurry the job somewhat, otherwise omit the use of japan. Apply one coat of this priming thinly and avoid brush marks by using chisel-point flat brushes.

It would be far better, if time permitted, to have the priming coat all oil, with only a very small portion of white lead and lamp black, but time is a great factor nowadays, and durability is generally sacrificed to a certain extent. When this priming is dry enough to admit of sandpapering, go over it with No. 1 paper and then apply what is called a first coat of lead, made from keg lead and lamp black, thinned with one part raw oil and three parts turps, to which enough coach japan should be added to make it dry hard enough to sandpaper in twenty-four hours. Apply this lead with chisel-point bristle brushes and rub out well, avoiding brush marks. Smooth down with No. ¼ sandpaper. Careful dusting after sandpapering must not be lost sight of, as it is one of the most important features in producing a clean job. The second coat of lead or flat lead is applied after surfacing with knifing in lead or rough stuff and puttying. The running gear of a hearse may be surfaced with "knifing in" or "glazing lead," while the body part should have at least three coats of rough stuff. The knifing in or glazing lead can be purchased from the manufacturer or prepared at the

shop by running through a hand paint mill two parts of dry white lead and one part of keg lead, with enough equal parts of rubbing varnish and coach japan to make a soft paste, which is thinned to working consistency with a little turps. For black finish it is colored with some lamp black. This is applied stout with a bristle brush and pressed in and smoothed down with a broad blade elastic putty knife, so that very little sandpapering will be necessary for the after coats.

Puttying up is done on this knifing in coat, the putty consisting of the glazing lead referred to stiffened with some dry white lead and a little fine whiting that is well pounded on a block of wood with a wooden mallet. When the putty has hardened sufficiently, go over all with No. $\frac{1}{2}$ sandpaper, dust carefully and apply the second coat or flat lead. This should consist of very fine keg lead thinned with turpentine only and a small portion of coach japan with enough lamp black to give a dark lead color. Apply with a camel's hair brush, and when dry go over it lightly with No. 0 sandpaper, then rub down with moss or curled hair, using flour of pumice. This completes the surfacing for the running parts, which are now ready for the color coats.

As to the body part, in order to make a first-class mirror-like job, rough stuff surfacing is required. Purchase from your supply house good one-day rough stuff or make it yourself by running through a paint mill the following: Five pounds Reno's filler, and three pounds stiff ground keg lead, with enough of equal parts quick rubbing varnish and coach japan to make a fairly stiff paste. Thin with turpentine and apply one coat per day, not less than three coats—four if necessary to obtain good rubbing surface.

Putty up when last coat is dry, and let stand at least three days. Apply a guide coat of the rough stuff, colored with fine yellow ocher and made very thin with turps. In applying rough stuff, work rapidly and thereby avoid brush marks. For rubbing down rough stuff on fine jobs or high-grade carriage work, we would not advocate the use of rubbing bricks, but instead recommend the use of best selected lump pumice, shaped to suit the work in hand and well cleansed by washing from all grit, always selecting the most porous stone. The utensils required for rubbing rough stuff surface are plenty of clean water, good sponges and chamois skins and an assortment of pumice stone. Too much water should not be used, not more than to keep the stone from gumming up, and straight strokes all in one direction and of uniform pressure are advised. To determine whether sufficient rubbing has been done, the palm of the hand should be passed crosswise over the rubbed surface. The rubbing satisfactorily accomplished, the surface should be washed down thoroughly and dried with chamois skins, the corners of moldings cleaned out with a pointed stick or suitable stiff brush and the second or flat coat of lead color applied, which makes the job ready for the color coats and finishing varnish.

To apply the black finish we would suggest the use of lamp black in japan, thinned with turpentine and a tablespoonful of elastic rubbing varnish to one pint of the thinned black, as first coat of black over the flat lead color. This to be followed with one flat coat of highest grade coach ivory black in japan and one coat of some black mixed with elastic rubbing varnish, one day between coats. This

is to be followed by a flowing coat of rubbing varnish of good body, which after three days is to be rubbed with pumice and water, using oo powdered pumice and rubbing felt. For extra good work two or three coats of rubbing varnish must be applied, and each one rubbed down conscientiously. This done and proper time having been given for guarding against possible sweating of the rubbed surface, touch up with color any places that may have been rubbed through and proceed to apply the finishing coats of varnish, which should be flowed on carefully in a dust-free room of good warm temperature.

— 604 —

Creosote Shingle Stains and Linseed Oil Stains.

Creosote stains for shingles have come in such high favor through the belief that they have highly preservative properties, preventing dry rot in the wood and also from the theory that creosote stains are antiseptic and do not affect the water that in many localities is collected in cisterns from roofs of houses and barns, while there is a general idea that paint acts injuriously upon water so collected and makes it unfit for the use of man or beast. While we do not share such belief we are of the opinion, and, in fact, know, that a creosote stain, when well made, will answer the purpose of protecting shingles against dry rot, etc., better than a linseed oil stain, because it penetrates deeper into the wood and being very slow to dry lasts longer and does not require repainting one-half as often as ordinary linseed oil stain or paint. Another point in its favor is that on shingles well dipped into creosote stain before they are laid, and given another coat after being in place on a roof or on the gable end of a cottage, mildew or fungus growth cannot establish itself upon it, as is the case with oil stains with mineral or earthy paint bases. In our own experience we found that a stain made from inert pigment, ground in oil, thinned with pine tar, liquid drier and benzine or kerosene, and applied to the shingles the same as creosote stain, the shingles being laid on neighboring roofs, preserved the shingles fully as well after an exposure of four years, the oil and pine tar stains had held their color better. In another instance, where linseed oil paints, white and moss green, were simply thinned with benzine, into which preparation the shingles were dipped, then laid and given a coat of the stain, the color held out well, but the shingles showed dry rot in many places and required relaying. You will find it a difficult matter to overcome the tendency to favor creosote shingle stains.

— 605 —

Silica for a Brick or Cement Wash.

Silica, when obtained from flint, is called silex, and that obtained from sand or quartz is known as silica or silver white. Pure silex does not contain lime in any form, hence there is no lime preparation that equals it in character. Commercial whiting consists of about 84 per cent. carbonate of lime in the form of chalk and 16 per cent. of silex or silica (flint or sand). Silex would not improve whitewash in either

body or binding properties, as it is a very brittle material. Fine whitening is often added to whitewash to improve its body, glue or rice flour to improve its binding properties, dairy salt to keep the whitewash from drying too quickly and from rubbing off after drying, but we can see no advantage whatever that could be gained from the addition of silica, silex, marble dust and similar whites.

— 606 —

Imitating Mahogany by Staining with Acid.

Your question is not quite clear; if you wish to imitate mahogany by the use of acid, beechwood is best suited. Have this planed smooth, then rub the surface with a solution of nitric acid, which you can get from any druggist. When this has colored the wood sufficiently, apply with a soft brush the following spirit varnish: One ounce of dragon's blood dissolved in one pint of alcohol. The solution is mixed with one-half ounce of carbonate of soda and filtered before use. Should you desire, however, to simply darken mahogany in certain places by burning, use dilute nitric acid, and when spaces are sufficiently dark, wash over with soda water to neutralize remaining traces of the acid.

— 607 —

Finishing the Top of a Barroom Counter.

The only reliable finish for this class of tops is the old fashioned oil polish, as neither varnish polish by the American or French process will stand the continual wetting and the effect of the liquids. Oil polish will stand this and allow the tops to remain in good condition. The process, though very simple, is very tedious and therefore not much in favor, but if customers are willing to pay for it, the painter should not hesitate to undertake the job. If the top is a new one, it should first be stained to suit the taste with oil stain and then filled with colored paste filler, and when this is dry, smooth sandpapered. Then boiled linseed oil is applied with a brush and immediately rubbed in with a rubber made by wrapping a piece of felt around a flat stone (the heavier the better). After the first rubbing the work is allowed to stand for a week, when a second rubbing is given in the same manner and so on until a satisfactory surface and polish is obtained. This may occupy six weeks, and the way it is usually done, the rubbing is begun on closing the bar and a false top placed over the work until it is finished. If the top be an old one and in good condition, it simply requires smooth sandpapering and touching up with stain before resorting to the oil polish.

— 608 —

Why Lime or Lime Water Is Used in Cement Wash.

Referring back to No. 580.

By lime water we mean a saturated solution of lime, or as much lime in the water as it will take up. A little excess of lime would not. Lime water is added to the cement wash because it imparts binding properties to the wash which it would not have if clear water was used only. The salt is added to keep the wash from setting too quickly and assist in absorbing moisture. If well dissolved before it is added

to the wash it will not cause discoloration. The paragraph in question was the answer to an inquiry for the proper binder for a cement wash for new laid walls, partly concrete, brick and stone, that were to be made to look good for a time without rough plaster or paint; in other words, a temporary expedient until the walls were thought safe to paint after a year or so. This cement wash was decided upon as best, because it would not hinder the expulsion of moisture nor the neutralization of the caustic properties of the lime in the newly laid mortar.

— 609 —

Renovating a Surface in Zinc White That Is Badly Cracked.

The front, shelving and counters of a dry goods store had been painted with zinc white and had cracked badly. Is there any way to make a first class job without removing the old paint?

We say emphatically, No! A good job cannot be made except by removing the old paint and building up from the foundation. You say that it is badly cracked, therefore it is probable that the cracks extend clean down to the wood, and in such case, no matter what you may do, the cracks will show up through the new paint in a short time. We do not suspect the shelvings and counters of a country dry goods store to have many, if any, coats of white lead as a foundation for the zinc coats, and in consequence it would not do any good to sandpaper down the zinc coats as much as possible and then fill in with a few lead coats. The best plan is to remove the old paint and prime and first coat with pure lead, and use zinc white for the finishing coat only. If the lead is held flat it will not strike through one coat of zinc.

— 610 —

White Lead and Oil Paint Going Black on North and East Exposures Repeatedly.

A house was painted in the spring, using a certain brand of pure white lead and oil. The base of the porch columns and window casings on the north and east sides turned black in four months. It was painted again the next year by another firm, and come out blacker than ever in less than two months. The base of the columns are paneled and seem so porous the paint sinks right in. Originally the house was painted bronze green and then white before the first painter worked on it. There are no trees round the house.

The brand of white lead you mention is of first class quality and strictly pure, and in our opinion has nothing at all to do with the trouble. We think that the failure is due to local faults, which might be mildew or brought about by moisture from within. White lead and oil paint alone is scarcely ever affected by mildew, unless there is moisture present when the paint is not quite dry. If the trouble is due to mildew, your proposed two coats of red lead and white lead will not correct the fault, and we would suggest that you persuade the owner of the house to have one or more of the panels in the porch columns removed, and the paint thereon subjected to microscopical examination, in order to discover whether the blackening of the paint is actually due

to mildew or to wet rot in the lumber. In the latter case there is no remedy but to remove and replace the panels and window casings, the dwelling becoming unsanitary in time from this house rot or fungus. If the timber is sound, then the trouble is from without, and if your plan of red lead priming (after removing all the old paint preferably by burning off) is followed, the red lead paint holds not too oily and the white made to dry reasonably quickly, further blacking of the white may be arrested.

— 611 —

Keeping Back the Sap in California Pine.

We often find it difficult even to kill the knots in white pine when they are simply touched up with shellac varnish and not more than two coats of paint are applied. No matter how dark the tint may be, the knots will show through as soon as the last coat of paint is fairly dry, especially on southern exposures. In your case, however, it is not so much a question of knots as of sap throughout. We would suggest that you make a priming of equal parts by weight of pure white lead in oil and pure dry red lead, using two parts raw oil and one part spirits of turpentine for thinning, making the prime rather thin and rubbing it well into the wood. Do not mix more at one time than can be used the same day. Paint placed over this priming is not likely to peel or blister if of fair quality and properly applied. On this lumber, especially, every coat applied over the priming should be applied stout, but brushed out thin.

— 612 —

How Shingle Stains Can Be Produced Cheaply and How Shingles Are Dipped.

See No. 604, but for your special benefit we would add that if your creosote stains fade badly and your oil stains become darker on exposure, you have not taken care to allow for change in drying out and have not selected your coloring matter with a view to fastness to light. Take a good quality of liquid paint of the proper color, or take oil color and thin with raw linseed oil to the consistence of liquid paint, not omitting a little japan, thin either of these mixtures with equal parts of benzine and kerosene, making it almost as liquid as water, so that when shingle wood is dipped into it, it merely colors the strip, so that when set up it shows the effect desired.

To dip the shingles, any convenient vessel is proper, be it a shallow box, keg or barrel into which the shingles may be stood to the depth required to be stained. After a few minutes' immersion they are thrown aside to make room for others. When the shingles have been laid on roofs, as a rule here in the East, one coat of the stain is applied with large brushes.

— 613 —

How a First-Class Job of Flat Work Is Produced.

We must assume that you refer to interior work in white or in tints. On new woodwork a priming of white lead in oil, a second coat of white lead, thinned with equal parts oil and turps and a third coat of

white lead, thinned all turps, with a small portion of white japan in each, is sufficient for a good foundation for a good flat finish, providing brush marks have been avoided and the last coat of lead smoothed down with No. $\frac{1}{2}$ sandpaper. Next one coat of best French zinc white in oil is thinned with turpentine and a little white japan, applied with a chisel-point flat brush. This dries with eggshell gloss, if manipulated properly, and the job is then finished with one coat of French zinc in damar varnish, thinned with turpentine only and applied with a camel's hair brush. A job done in this way gives an air of solidity and will not turn yellow. For plastered walls we would recommend the same method, excepting that the first coat of lead be applied directly on the wall without any size, and that puttying, if necessary, be done on this priming coat. Then a glue size is to follow before the half and half lead is applied, to stop further suction, or in place of glue size, a thin coat of wall or suction varnish may be given. Balance of work to be the same as for woodwork. For tinted work the ground coats should be of the same color as the finish. For old work, the surface should be prepared by cutting out cracks and plastering or puttuying up preparatory to painting and all new patchwork or cut out and filled in cracks touched up to match the old color. In such case, one coat of lead, thinned equal oil and turps, and the two coats of zinc white as above will generally suffice, but good care must be taken that the renovated places will not show through.

— 614 —

The Best Wax for Polishing Hardwood Floors.

The wax that has the highest melting point is best for the purpose, because of its hardness after application. Brazilian or Carnauba wax has that property, its melting point being about 185 deg. F., while bleached beeswax melts at 145 deg. F. and paraffine waxes will melt at as low a temperature as 115 deg. F.

Carnauba wax, melted in a suitable kettle and thinned with spirits of turpentine, so that on cooling it has the consistency of soft tallow, is an excellent article for the purpose. The wax should be applied in that consistency to the floor with a large brush as evenly as possible, permitted to set and then rubbed with a weighted floor brush. When the floor is new two coats are required; one to fill and level up, the second to give luster. If the work is well done heel marks will not show to any extent. Elbow grease is a factor here, as in many other things pertaining to the work of the painter.

— 615 —

Rubbed Varnish Surface on Interiors.

Several rooms that have been varnished are to be rubbed down and given another coat of varnish. Walls and ceilings are all wood.

The best material for rubbing is steel wool or curled hair, powdered pumice and water. We cannot say what price per yard you should base your figures on, as we do not know whether you intend to simply "moss" it down or rub to a dead finish. The job may be worth from ten cents to forty cents per yard; it all depends on how much labor you expect to expend upon it. For simply mossing, that is, "knocking

off" the gloss, we should say fifteen cents per square yard where there are no moldings, or for rubbing to a dead finish thirty cents per yard we should consider a fair price, but if there are many moldings in the room you should charge ten cents more per yard in either case. For applying the succeeding coat or varnish we should say that six cents per yard for labor would be about proper, the varnish to be calculated at cost, one gallon for fifty yards.

— 616 —

How Sea Shells May Be Cleaned and Polished.

There are several ways to accomplish this. First, boil in a strong solution of potash, then polish with hydrochloric acid and whiting.

Second, clean the surface with hydrochloric acid until the outer skin is removed. Wash in warm water and dry in sawdust, then polish with chamois skin. If the shell has no natural gloss, rub with tripoli and turpentine, using chamois skin, and finish with olive oil.

Third, rough shells are first ground on a coarse stone, then smoothed with pumice and water on a buffer wheel or with a hand polisher and finished with rotten stone.

— 617 —

Best Shingles for Roofs and How to Coat Them.

The roof of a large barn has shingling lath about twelve and one-half inches apart. Could a good and lasting job be made by using eighteen-inch shingles, dipping them in either hot linseed or hot petroleum oil or applying either after the shingles are laid? What kind of shingles are best?

If you use 18-inch shingles you will need to put intermediate laths, as no shingle should show more than one-third its face to the weather. Cedar, juniper and cypress are undoubtedly the best woods for shingles. Yellow pine shingles will outlast those made from the softer woods, but are apt to split, while beechwood would be lighter and less liable to warping and splitting. Where redwood shingles can be obtained they are excellent. If you do not care to have the shingles stained and object to creosote, we would suggest that you procure a solution of persulphate of iron, marking 2 to $2\frac{1}{2}$ deg. Be', into which dip the shingles. Then, when they are laid on the roof, give them a good coat of hot, raw linseed oil with a paint brush, which will remove the bluish tint given by the solution on drying, changing it to a brown, giving the appearance of being weathered. There will be no harm done in giving an old shingle roof a coat of raw linseed oil hot.

— 618 —

Thinning of Varnish That Has Become Too Stout.

You must not use gasoline for thinning varnish at any time, as it is entirely too volatile. You can thin with 62 deg. benzine, providing the properties of the varnish will stand such treatment without becoming turbid, but we would suggest that you use pure spirits of turpentine to be on the safe side, or make a trial with benzine on a small scale before taking the risk of ruining a lot of valuable material. In any

case, however, we should advise you to take the cork out of your varnish can and set the can in a vessel of hot water, and do the same with your turpentine or benzine, in order to have both the varnish and thinners of about the same temperature on mixing. When you have succeeded in thinning the varnish without its becoming turbid or showing rubber-like separation it will be well to permit it to set for a few days in a warm place; otherwise it is liable to give a sandy appearance to the work.

— 619 —

To Remove Wax or Shellac from Floors.

To remove wax from floors use benzine or gasoline and a good scrubbing brush; give the benzine time to soften the wax. To remove the shellac from floors use amylacetate, acetone, wood alcohol and fusel oil, but have plenty of ventilation in the room.

— 620 —

Virtue or Value in Paint Made from Paint Skins.

There are several ways to recover useful material from paint skins that are fairly oily and soft, but all labor is lost on the hard scrapings that require to be chipped from sides of mixing pots or paint pots, or when it has to be resolved by means of caustic potash or lime. Paint skins while still oily and elastic may be boiled over a moderate fire with an addition of linseed oil, when the valuable paint material in the skins will soften, so that by straining it may be freed from the useless resinified, insoluble matter. This makes a first-class paint for roofs and general painting, but should not be used for priming under any conditions, because top coats would be apt to peel from it. The best method, however, so far as economy is concerned, is to keep a skin paint receptacle in the shop, have all remnants from pots and mixers deposited therein, and run the material through paint mill and strainer before it becomes too old and fatty.

— 621 —

Oak Finished with Water Stain and Wax.

When water stain and wax finish are specified filler is not called for, because the wax is expected to act as filling and will do so if properly employed. Have the surface well planed and smooth sandpapered, then apply the water stain of the color desired as often as required to give the desired effect, then apply your wax. This you can prepare by melting good pure yellow beeswax (the harder waxes are admissible for floors, but not for furniture or the woodwork about hall or room) in a water bath with turpentine, say one pound beeswax to three pints turpentine. The consistency of the wax should be that of cream, applied with a brush and allowed to set for at least one-half day, if possible twenty-four hours, then it should be rubbed over briskly with a suitable brush until it shows a polish. The first coat on new wood acting as filler merely, a second coat will be required for a good job. In our opinion, water stain and wax finish is about the most economical and while it would not look as well on other woods, makes a first-class

appearance on oak. The drawback about this method of wood finishing is that it will not stand dampness or wetting.

— 622 —

Removing Paint that Has Been Sanded.

The most effective and surest method will be burning off with the torch, using the scraper. On account of the sand, paint removers will not answer as well as they probably would if only the oil paint was there. Scraping alone is too slow and tedious a process.

— 623 —

Preparation for Flatting Varnish.

An article was wanted that would flat varnish so it will not scratch and that paint applied over it will not peel. The inquirer had heard that Danish painters use a powder which they grind in turpentine and mix with the varnish to obtain the result referred to.

We have not heard of the powder you refer to, nor do we know of any preparation that will keep varnish from scratching. At any rate, what has the flatting to do with the scratching? Varnish that will dry flat and hard can be made by treating the resins, or gums, with caustic soda and after a thorough washing and drying of the resulting precipitate, it may be dissolved in either benzine or turpentine, producing a dead flat surface of great hardness in either case, when applied in the manner of varnish. Why not buy a flatting varnish, instead of risking spoiling a lot of good varnish by adding to it something unknown or untried?

— 624 —

Cheap Size for New or Whitewashed Plastered Walls to Be Kalsomined.

To size a new plastered wall for kalsomine, make a size of good pale glue, one pound; rosin soap, one pound; alum, two pounds. Soak the glue in cold water until soft, pour off the water that has not been taken up and pour on boiling water until all the glue has dissolved. Slice the soap fine and dissolve in hot water, and do the same with the alum. Stir the glue and soap solutions together, then add the alum solution. Thin the mixture with enough water to make it work well under the brush. Give two coats if one is not sufficient to stop suction in the wall. A simple glue size is often sufficient, but the glue, soap and alum size is better. When walls have been whitewashed and the wash is firm treat the walls to a wash of strong vinegar, and when this has dried give one or two coats of warm glue size, which should be rather thin to penetrate the whitewash and hold it firmly to the plaster. There is nothing more economical.

— 625 —

Unfading Blue, Red and Yellow for Interior Wall Painting.

For wall painting lime proof colors should be selected, and among these may be classed cobalt blue, indigo blue, ultramarine blue and blue smalt; Indian yellow, Naples yellow and permanent or zinc yellow; English vermilion, Madder lake and a comparatively recent product, a very brilliant red, sold under various proprietary names, such as permanent, durable or unfading red.

— 626 —

Kalsomining Over Old Wall Paper.

Old wall paper should always be removed before kalsomining, and the wall treated to a thin size of glue, so as to make the kalsomine dry out uniform and evenly. When, however, it is necessary to apply kalsomine over wall paper, the paper should be given one or two coats of thin glue size, which is best applied fairly warm so as to penetrate deeply. If the paper does not become loose on or immediately after the application of the size, it is safe to go ahead with the kalsomine. A thin coat or two of thin wall or suction varnish will sometimes serve even better.

— 627 —

A Puzzle in Paints Out in Oregon.

A school building in Oregon was painted when erected, and two years later was in such bad condition as to make repainting necessary. The condition of the paint gave the appearance of pebble embossed wall paper. It looked as though the paint had parted more in some places than in others. Three years later the school house looked worse than ever, while a residence next door painted at the same time, with the same material, was in good condition.

From your description we would assume that it is an aggravated case of alligatoring, which may be brought about by too heavy a priming coat that was not given time to dry and harden before the succeeding coat or coats were put on. Fatty linseed oil or rosin oil in the priming coat, and rosin oil or rosin varnish in the finishing coat will produce the very effect described by you. The only remedy in such a case is to burn off the paint clean to the wood before repainting, and paint with good materials from the very foundation in the proper manner.

— 628 —

How Ink Stains May Be Removed from Floors.

After scouring the spots with moistened sand, apply a solution of one pound of oil of vitriol and two quarts of water. If this discolors the wood to any extent, bleach with a saturated solution of oxalic acid. If the ink stains are not too old, an application of a paste made of chloride of lime and water will also remove them. The paste is put over the spots in a fairly thick layer and allowed to remain until nearly dry, when the layer is removed with a knife or spatula, and the spots washed with lukewarm water. Repeat the operation if not successful on first application.

— 629 —

Cleaning Brushes That Have Been Used in Shellac Varnish.

Shellac brushes are usually kept in the shellac varnish, which is thinned with alcohol from time to time to keep it fairly liquid. When taken out of the varnish, the brush can be washed out readily with methylated spirit, acetone or wood alcohol, and this is the only safe method of cleaning such brushes. Wash out your shellac varnish brushes at once, when through with them, in any of the spirits referred to and keep them in a good brush keeper until needed again.

— 630 —

How to Fill Cracks in an Old Hard Pine Floor and Refinish by Waxing.

In the first place the floor must be scoured thoroughly and allowed to become thoroughly dry. The cracks must be cleaned of all dirt, and if an oil putty is used, the edges of the cracks should be saturated with linseed oil, boiled or raw, to which some drier is added. If the cracks are not over a quarter of an inch in width, a pure linseed oil and whiting putty, to which some dry white lead and enough dry raw sienna to color it has been added, and all thoroughly kneaded together must be pressed firmly into the cracks, smoothed down nicely by wetting the putty knife with turpentine and allowed to dry hard and firm, when the surface is sandpapered. If the cracks are wider than a quarter of an inch they may be filled with a putty made from glue size, whiting and sawdust, with enough raw sienna or ocher to color the mass; or, better still, blotting paper is soaked in water, squeezed out and kneaded into a fairly stiff mass with glue size and whiting and colored with ocher or raw sienna and pressed firmly into the cracks. None of these putties will shrink when pressed down firmly and permitted to harden. You do not state whether the floor has been finished before, but no matter; if it has worn very much you cannot be expected to make a first-class job of it, unless it is planed off. Before beginning to wax it see that it is well sandpapered and, if desirable, apply a coat of hard drying stain, then give two coats of wax, the first to act as a filler and the second as a finish. Purchase the so-called Franch floor wax, which comes in the consistency of soft butter and dries very hard, or make your own by melting beeswax in spirits of turpentine, using a water bath, but not an open fire. Apply it with a brush evenly and not too heavy, and when set up use a weighted floor brush and you will economize in time and have a good job.

— 631 —

Cracking and Flaking of House Paint.

A frame hotel was painted and less than a year after was a mass of cracks and was flaking off badly. The building had been painted twice before, using white lead and linseed oil, but this time the painter was induced to use a mixed paint. The surface was in good condition when he began to paint the last time. The trimmings were Tuscan red, and showed no cracks at

all. The same paint failed on several other jobs, though it stood fairly well when mixed with three parts of white lead.

This problem is easily solved when the composition of the pigment in the brand of paint you mention is considered. You need not look for the cause of the trouble in the old paint composed of pure white lead and linseed oil, but you must trace it entirely to the poor qualities of the pigment in the brand of paint you speak of. The reports that have come to us from time to time from entirely reliable sources, as well as the claims made for this paint by the parties interested in its sale, convince us that its composition is not based upon time honored principles or upon the practice of durable paint making that has been established by decades, not to say centuries, of actual wear and tear. So far as we know, there is no dishonesty practiced in the placing upon the market of this brand of paint, the vehicle or thinners being free from deleterious materials, but it seems to us that the pigment is not well selected to withstand the ravages of the elements that exterior painting is subjected to. A paint composed of zinc oxide and sulphate of barium cannot be expected to wear when it is used all the way through from priming to finish on raw wood, especially when it contains more than traces of free sulphur, as is sometimes the case with the pigment in question. Nor will it stand well when two coats of it are applied over old paint. It is bound to crack and flake in a short time, and the reason that it stood fairly well when one part of it was mixed with three parts of pure white lead must be looked for in the fact that in that case only about one-eighth of the total mixture consisted of zinc oxide. The claim that because this brand does not contain any lead at all it will hold its color does not hold good so long as free sulphur in determinable quantities, no matter how small, is present. Nor has this holding of color anything to do with the wear of the paint. It would be better by far to have the paint fade or darken and yet be in good condition for repainting than to have it crack, flake or peel, making it necessary to remove it clean to the wood with the paint burner or with a paint remover.

— 632 —

Can Blackened Orange Shellac Varnish Be Restored to Its Original Color?

Yes, it can be done by filtering through charred bones, but there is so much loss in the operation that the game is not worth the candle, and, besides, it entails much trouble and expense.

— 633 —

Spotting of Paint on Gable End Walls.

A gable end wall, the surface of which was in good condition, and had been painted every three years, several times, by the same painter, was given in the spring two coats of pure white lead, tinted with drop black and yellow ocher, and for seven months the job looked very well, but in the fall it began to spot in several places. He mixed the lead and colors for first coat two-thirds boiled oil, one-third turps, adding gold size japan; for second coat, equal boiled oil and turpentine, with gold size japan for drier.

The material and source of supply you mention would indicate that they were first class and strictly pure, but we are of the opinion that the practice of thinning the materials was radically wrong for exterior work. We do not criticise your method of thinning for first coat on old paint, but your second coat should not, under any circumstances, have had any turpentine. With the oil of the present day it is difficult enough to retain gloss for any length of time without shortening its life by drowning it with turpentine, and it is a wonder that it did not spot much sooner. That it spotted only in certain places appears to be due to the fact that such places in the old paint were more absorbent than others. We think that boiled linseed oil is not the proper vehicle to employ with white lead paint on exposed surfaces, and are certain that pure, well-settled raw linseed oil will wear longer. When exposed surfaces of paint begin to spot in places it means that the oil in the paint has either been absorbed by porosity underneath, or that it has begun to perish. In either case it is detrimental to the appearance and to the wear or life of the paint.

— 634 —

Priming or First Coating Exterior Brick Walls.

It is required to paint a brick house that is fifty years old, the walls of which have never been painted or coated in any way.

In a brick wall of the age you mention there is no danger from caustic properties in the mortar used in the joints, unless the wall has been recently pointed. First give the wall a good brushing with a stiff corn broom to clean it from dust or loose sand, and before priming see that the wall is dry. You must not under any consideration seal up moisture in the bricks, or you may be sure that the best paint will peel when the sun gets its work in. If your finish is to be red, use a good brand of Venetian red and thin with pure raw linseed oil and a little japan. Make the paint rather thin and brush it well into the bricks. If your color is to be buff, mix your priming from two parts yellow ocher and one part pure white lead, thinning also with pure raw linseed oil and a little japan, holding the paint also thin, flowing it on freely and rubbing it well into the brick. When the priming has dried, putty up all holes and joints with putty that is colored to suit. A good job cannot be made on unpainted brick with less than three coats. No matter whether you desire gloss or flat finish, thin the second coat with one-third turpentine and give it good body. Have it fairly stout and rub out well and smooth. For a gloss finish have the last coat all oil, good kettle boiled oil is best if red is used, while for tinted white lead raw linseed oil and japan is more lasting. For flat finish, if you do not intend to use the flat black color offered by paint makers, thin your paste with one-fourth japan and three-fourths turpentine, and should it lack in binding properties, add a trifle of good outside varnish.

— 635 —

Paint Peeling from Kalsomine—How to Prevent This in Patching Up.

The walls of an old room have been painted over kalsomine, and are peeling to the white in spots, especially near the stove. Elsewhere the

paint appears to be hard and firm. The painter, who is called on to renovate it, desires to avoid the tedious job of scraping clean to the plaster, which would also be apt to scar the walls more or less, yet does not wish to run the risk of having his work scale and peel.

In our opinion it depends on the condition of the old paint whether you can hold it down with elastic varnish. Although you may suppose that the old paint and kalsomine is firm where it has not peeled, it may be only a question of time when it would peel in spite of the varnish. If the paint in those spots has peeled to the white it means, we assume, that paint and kalsomine have both cleared off clean to the plaster. In that case the paint has dried out in those spots more than at other places, has contracted and pulled the kalsomine with it. It can hardly be expected that you can fill up the spots and then hold all of the paint down with varnish, because the latter cannot penetrate through to the plaster and hold it there. But if you have a means of taking off the old paint down to the kalsomine, the varnish, if thin enough and the kalsomine not too rich in glue, might penetrate the latter and hold it on the plaster, when your new paint would be safe. There are plenty of instantaneous paint removers on the market; try one of these, taking the paint off to the kalsomine, then apply a coat of varnish and over this your paint.

— 636 —

What Is Venice Turpentine and What Is Oil of Turpentine?

Genuine Venice turpentine is the product of the larch tree, *Larix Europaea*, but is now a rare article. It is very pale and aromatic, of the consistency of thick honey, similar to Canada balsam, which we believe is generally sold for it. It is a first-class material to mix with gum damar, in order to make damar varnish work more freely. It can be added also to shellac varnish for a similar purpose.

Oil of turpentine is the name given in Europe to our spirits of turpentine. It is also called essence of turpentine.

— 637 —

How to Imitate Cypress by Graining.

The grain of cypress is somewhat like that of yellow pine, but is broader in the heart and finer grained. The graining in imitation of cypress is done in oil only. The ground should be a little darker than that which is used for oak. For graining color raw and burnt sienna and burnt umber is mixed in oil with the usual quantity of japan. When the color is put in the hearts are wiped out in the usual way. A rubber comb may be used to make portions of the heart, but care must be taken that the lines made by the comb follow those made by the hand. The steel combs should not be used over the lines made by the rubber comb, and a very thin glaze is only needed to finish cypress graining.

— 638 —

What Is Meant by the Term "Drying Oil?"

The term drying oil stands simply for such oils as will dry and harden, or, in other words, form a film or skin on exposure to the air. The most important among them are linseed oil, poppy-seed oil and nut oil from walnuts. Sunflower seed and hempseed oil do not cut any figure in this country.

— 639 —

Sea-Green Stain for Whitewood.

Take chemically pure chrome green, light, ground fine in linseed oil and enough raw sienna in oil and mix the two in sufficient quantity to produce proper effect, then thin with one part boiled linseed oil, one part brown japan and two parts turpentine, making the mixture very thin; apply with brush or cloth and when set wipe across the grain.

— 640 —

Paste for and Pasting of Pressed Wall Paper.

The ordinary paper hangers' paste made by stirring rye flour or wheat flour into cold water until all lumps are beaten out and then bringing it to a boil under constant agitation will do very well for pressed papers, but must be heavy, so that it will not make the paper too moist or limp before it is on the wall, as that would spoil the relief figures. Each piece of paper must be hung as soon as pasted for the same reason. Trim the paper while dry, before pasting, in the usual way with knife and straight edge, but on pasting take good care not to run your paste over the edges, nor do not have it too heavy close to the edge.

— 641 —

A Good Formula for Preparing Kalsomine.

This is used by the foremost firm of painters and decorators of one of the most thriving cities in the western part of the United States.

One pound of uncolored gelatine glue, as free from grease as possible, is soaked over night in cold water sufficient to cover the glue. Thirty pounds of English cliffstone Paris white, bolted or best bolted gilders' whiting, is also soaked in sufficient water to make a paste over night, and next morning both are heated with steam or over a moderate fire in a water bath to the boiling point, and when the glue is fully dissolved the two materials are thoroughly mixed. In summer time on cooling a small portion of carbolic acid, say about one-eighth of an ounce, diluted with water, is added for each pound of glue used in the aforesaid formula to keep it from souring, and in this way the kalsomine will keep for some weeks. It is said that the workmen rather like this preparation, because of its good working properties.

— 642 —

Removing Grease Spots from Stone.

Pour strong soda dissolved in water, while boiling hot, on the spot or spots, mix some fuller's earth in boiling water to a thin paste, put

a coat of this over the spots and let it remain over night. If this has not taken all of the grease out repeat the operation. Sometimes, when the grease has not penetrated deeply, it may be removed by rubbing the spot with a hard stone and sand, using very hot water and soap and soda.

— 643 —

A Good Putty for Large Cracks and Holes.

Chop up paint skins quite fine and mix with boiled linseed oil, then stiffen up with boiled whiting and knead thoroughly to the consistency of glaziers' putty. The properties of this putty are its great elasticity and greater drying qualities as compared with ordinary whiting and linseed-oil putty, because with the paint skins a body is entered which possesses the drying as well as the elastic properties to a great degree, as well as toughness.

— 644 —

Beating Paint in Dipping Vats by Steam.

The question was asked whether it would be a benefit or injury to dipping paint, if beaten up in the vats by steam pipes running through the apparatus.

Undoubtedly it would be a very decided injury to the paint, because your steam pipes would require to be perforated, and the steam would naturally turn to water on striking the paint. Even the blowing of air through a dipping vat would injure the paint, because dipping paints usually contain a great deal of volatile thinners, such as turpentine or benzine, mostly the latter, and a continuous stream of air would tend to rapid evaporation of the same, thickening up and livering the paint, to say nothing of the loss. Continued stirring of dipping paints is necessary only when heavy materials are employed as the base, and these paints can be so made that only an occasional stirring is required to hold them in suspension.

— 645 —

Spots on Wall Paper Hung on Damp Walls.

Such spots will appear not only on damp walls, but also when the paste is not evenly applied or when the wall is more porous in certain places than in others. Also when the air in the room is so saturated with moisture that the water in the paste cannot be absorbed by it. On humid days it is best to close the windows and have only the doors of the rooms open and have a light fire in the room, so that the moisture is taken through the chimney flue. In this way the water spots in wall paper may be prevented. But in damp walls it is futile to depend on drying out by the means given, and the only preventive is battening out with canvas or muslin, so as to leave an air space between the damp wall and the paper.

— 646 —

Painting With Oil Paint on Whitewashed Walls.

A shop has been whitewashed, but the lime dusts off. Will lead and oil paint stick over the whitewash?

That depends on conditions. You fail to state how often the wall has been whitewashed and whether the wall was rough or smooth or smoky. We have seen lead and oil stick very well, but there had been only two thin coats of whitewash and the wall was built of brick. If the whitewash, however, is very thick the oil of the lead paint will be drawn into the lime, and if the wall behind it is a hard one or has been smoky the whitewash and lead paint are liable to come off together. If the whitewash is thin you can safely risk it, and to make doubly sure apply a size of two parts japan, one part raw oil and one part turpentine, over which the oil paint will hold securely. If, however, your object is simply to obtain a surface that will not rub off, slake your lime with hot water, leave it stout, and when cool thin with skimmed milk.

— 647 —

Raw Linseed Oil vs. Boiled Oil for Wagon Painting.

We see no objection to using raw linseed oil in place of boiled oil in wagon work; on the contrary, we think the wearing quality of the paint will be increased by the use of pure, well settled raw linseed oil, when we consider that the boiling of oil with driers changes the medium into a varnish that no longer has the qualities of the crude article, and also in view of the fact that much of the commercial boiled oil is nothing more than raw oil doctored up with cheap driers, and has never been near a fire. For wagon work, we should say that seven and one-half pints of raw oil and one-half pint of a first-class liquid (oil) drier would be about the proper proportion for summer and seven pints raw oil and one pint liquid drier for winter, drying as well as boiled oil, to which little or no drier is added.

— 648 —

How Roughstuff May Be Kept in Good Condition.

Mix your roughstuff to a stiff paste, and after taking from it the quantity immediately needed put the balance into a white lead keg, level the roughstuff down nicely and cover it with a piece of stout paraffine or parchment paper, which will exclude the air. Or a little turpentine may be put on top of the roughstuff and a piece of oilcloth tied securely over top of keg. By following either of these methods the filler can be kept for a long time. When mixed thin, ready for use, and allowed to set around it soon becomes gummy, stringy and worthless.

— 649 —

Finishing Furniture in Sixteenth Century Style.

The wood is first filled with a paste that is made of bolted whiting, boiled oil and japan and thinned with turpentine. This filler is applied to the work with an ordinary bristle brush, usually 6-0 size.

When coated, and before it has time to set, the surplus filler is removed with rags or waste, always wiping across the grain, in order to have it filled properly. When the filler is dry and hard the work is smoothly sandpapered and dusted and a coat of stain applied, which is made as follows: Three parts dry Vandyke brown, one part dry burnt sienna mixed with boiled oil and japan and thinned with turpentine. The stain must be used sparingly and brushed out well. On large surfaces, such as table tops, wipe off the stain in the center about one-eighth of the length and the whole width of the table, then, with a badger-hair blender, gradually blend the stain toward the ends, blending crosswise and clear across with each stroke of the blender, which will give the antiquated appearance. The other parts are wiped out and blended to correspond, and when dry two coats of hard oil or furniture varnish are given. Work of a better class is given two coats of rubbing varnish and rubbed down with pumice and water until all the gloss is removed, and is then polished with the following preparation: One pint raw oil, one-half pint alcohol, one-half pint vinegar and one-eighth pint ammonia.

— 650 —

To Restore Enameled Bricks to Their Original Color.

A painter was called on to restore the original color of so-called enameled bricks on a building where evidently the builder had used two kinds of bricks, as one-half the front is all right, and the other half appears as if lamp black had been spilled over it. The color of the bricks is gray. Muriatic acid, in various degrees of dilution, had been tried without success.

We are unable to assist you, because you have failed to state one essential point. Are the bricks glazed like earthenware or are they of the kind that are merely dipped in paint, or have they been enameled after the front was finished? If the two last named methods have been followed the remedy is simple enough, and that is to paint them over with one flat coat, followed by a gloss coat for finish. But if they are glazed bricks, as we think they are, there is nothing in the shape of acids or any other material that will restore the original color, because the trouble is in the flux used in the glaze, which has blackened, probably from the material used in the bricks, or from some defect in the glaze itself, most likely the latter. The only remedy that we can think of would be to repaint the whole front, which, if, as you say that the bricks are porous, would not be a difficult matter to do, especially if you give a good priming coat that will adhere well, and on which your enamel or gloss paint will hold and wear well. But we should advise you to hold your enamel very elastic, using good boiled oil and a little first-class outside varnish for the binder, and pure lead, with not over 15 or 20 per cent. zinc oxide, tinted with lampblack, etc., to proper shade for the pigment. Unless the bricks are porous your priming coat must not be very oily. At any rate, you should mix it in such a manner that it will dry flat, or at least with no more than egg-shell gloss.

— 651 —

Finishing Musical Instruments.

The process of polishing violins, guitars, banjos, etc., is of French origin, and is as follows: First a coat of shellac varnish is given to the wood. When dry it is carefully glass-papered, then a small quantity of alcohol shellac is poured into one dish and a similar quantity of clear linseed oil into another dish. Now a small piece of cotton is rolled up in a piece of soft chamois skin and tied up in the shape of a ball; then apply with a brush the shellac varnish on a small section of the surface, and before the shellac has a chance to dry dip the chamois skin ball into the oil and rub with a firm, steady motion over the section just coated, taking care to have the surface moist with oil, until the polish is obtained. When finishing in sections on the larger instruments take care to cause each section to lay close on to the last one done.

As to piano finishing, that work differs entirely from the French polishing referred to above, and it is much easier to give directions than to do the work successfully, which requires skill and long experience. To simply revarnish and repolish a piano it is necessary to apply two coats of piano rubbing varnish. After the second is applied it should be stood aside to harden for at least a week, then carefully and evenly rubbed with finest flour of pumice and water, and when, in the judgment of the operator, the rubbing is perfect, the surface is to be rinsed with soft or rain water and dried with softest chamois skin. Then a soft cloth (woolen) is dipped into sweet oil and rottenstone and the surface briskly rubbed until gloss is attained, when it should be wiped with soft rags. Now some finely sifted wheat flour is sprinkled on and the whole surface firmly and evenly rubbed with a piece of silk until the highly polished effect is had.

— 652 —

Dissolving Rubber so as to Mix With Oil.

Caoutchouc, or Para rubber, can be dissolved in disulphide of carbon, with coal tar benzol or with spirits of turpentine, and when the solution is liquid enough it will mix readily with oil. The rubber is cut into thin strips, put into a suitable tightly closing vessel and the solvent poured over it, so that the strips are fully covered, allowed to stand in a warm place and shaken frequently. When the mass is too much like a thick jelly, more solvent must be added until the desired fluidity is obtained. This accomplished, the solution can be mixed in varying proportions with boiled linseed oil, but it should be first strained to remove the unavoidable sediment, and oil and solution should be heated on a sand bath to make them amalgamate thoroughly. Solutions with coal tar benzol or turpentine are preferable to those made with disulphide of carbon, because of the fugitive character of the latter, which, when evaporated, is liable to leave behind the rubber in the oil in its original form, or at least in the shape of soft lumps.

— 653 —

How to Make a Good Job of China Glossing

Over the primer one coat of white lead in oil, thinned with equal parts of raw oil and turps. Let this become good and hard, then apply another coat of lead in oil, thinned with turps, only so as to dry flat. When dry and hard, smooth sandpaper and dust off. Now apply a coat of French zinc, ground in linseed oil, thin with turps and add a tablespoonful of white enamel varnish or damar varnish, so that it dries nearly flat. The final coat should be composed of French zinc in damar varnish, broken up with a little turpentine and thinned with damar varnish. A trifle of imitation cobalt blue or ultramarine blue added to this last coat will take away the slight, yellow cast of the varnish.

For very high-class work four parts of lead should be given, then one coat of French zinc, nearly flat, one coat of French zinc in damar, rubbed with pumice and water, and finished with clear, white damar varnish, to which a trifle of zinc may be added to give the desired white effect.

— 654 —

Substitutes for Linseed Oil in Painting.

A barn was primed with gray ocher as a pigment and an oil that is manufactured in the South and sold under a fancy name as a boiled paint oil and claimed to be equal, if not superior, to linseed oil. Three days after painting a finishing coat of white lead tinted with lamp black was given, thinned with boiled linseed oil. In three weeks the job began to crack and finally peeled, the undercoat being soft enough to be removed by the finger.

The name of the oil is sufficient to acquaint us with its source of manufacture, and you are not far astray when you say that it appears to be composed of rosin oil. It is really a combination of rosin products, mineral oil and enough linseed oil to act on the drier with which it is boiled. If you had used the material you did in finishing for the priming and the primer on top, results would have been far different, though not by any means satisfactory. When you have removed the objectionable slush and begin anew, allow the bared wood to dry out some, then commence your work as you should have done in the first place. Use strictly pure white lead, tinted to suit with lampblack, thinned with pure raw linseed oil, and just a trifle of liquid drier for the first or priming coat, and you will have a foundation on which any fair paint will stand as a finish. If you must economize don't do it on the priming, which is the foundation of all painting, but rather on the final coat. And, above all, never use boiled oil for priming a new surface, because to the use of boiled oil much of the blistering and peeling of paint is due. If you want a nice, glossy finish, use good, pure kettle-boiled linseed oil in the last coat, but avoid those nostrums, the so-called bunghole-boiled oils. Also avoid priming with gray ocher or inferior yellow or red ocher, as they will invariably tend to the peeling or flaking of the outer coats. On soft and spongy wood a primer made of pure white lead and a finely ground French ocher

is to be preferred to white lead alone, but the proportion of white lead should be greater than that of the other.

— 655 —

Liquid Brass Cleaner and Polish.

Most polishes are made in paste form, and there are legions of them in the market; but if you must have it in liquid form we would recommend the following as most effective: Dissolve one ounce of oxalic acid in one gill of hot water and stand aside to cool. Mix four ounces of rottenstone, finely powdered, with one-half ounce of dextrine that is also powdered very fine, and two ounces of sweet oil or palm oil to a paste, into which stir the oxalic acid solution. If too thick to form a liquid, add more water. Apply with a rag or sponge and rub dry with a piece of flannel or wash leather.

— 656 —

How the Brightness of a Tiled Floor Is Retained.

The addition of a half pint of kerosene oil to an ordinary bucket of water will give the best results as to bright appearance when the mopping is carefully done; but the addition of aqua ammonia and spirits of turpentine, say four tablespoonfuls former and two tablespoonfuls of the latter to a three-gallon bucket of water, will leave the tiles both clean and bright, even if the mopping is done carelessly. Under no condition should soap or strong soda be used, because tending to give the tiles an unsightly, dull appearance in a short time.

— 657 —

How Mirrors Can Be Made.

A liquid preparation for silvering mirrors may be made as follows: Take one part, by weight, of lead, one part of tin, one part bismuth. Melt these together, and before the mass cools or sets add ten parts mercury. Pour this liquid on the glass so that it covers all the surface, then let it drain off quickly. When the liquid has become perfectly dry and hard on the glass it may be coated with flat black, which will insure opacity and wearing properties.

— 658 —

Finishing Natural Wood.

1. Stain your natural wood first, if necessary, to obtain desired effect, then fill with paste filler and finish with good furniture varnish or best inside varnish, giving two coats, mopping the first coat if fine work is wanted.

2. Stain your mahogany with a thin oil stain, made from a mixture of burnt and raw sienna, to which a trifle rose pink may be added, fill with mahogany paste filler, give a good, full coat of rubbing varnish, rub or moss down and apply two coats of outside finishing varnish. If the wood is rich enough, staining may be omitted.

— 659 —

Best Way to Make Liquid Wood Filler.

Take, say two pounds of finely pulverized silix or China clay, which stir into one pint of good liquid drier, beat into a fine mass, then strain through an ordinary sieve with the aid of a brush, so that all the lumps are thoroughly broken up. Then add to this paste, while stirring continuously, say three quarts or one gallon of a good, pale furniture varnish. Let it stand awhile and then strain through a fine strainer or sieve. See, above all, that the silix or China clay you use in this mixture is bone dry. We would add, however, that you may find it cheaper to buy your liquid filled ready made, after counting up the cost for material and labor.

— 660 —

To Obtain a Gloss in Oil Paint That Will Stand Outside Exposure.

The questioner wanted something that would give a gloss that will stand outside exposure, to a lead and oil paint combined with a water solution, turpentine being used as a dryer. Will benzine act as well as turpentine as a dryer?

We are hardly initiated enough in the secret arts and mysteries of paint making to be enabled to answer your questions to your satisfaction, but know just enough to point out to you why a paint, such as you describe, cannot hold its gloss for any length of time, no matter what material you may add. In the first place, you have lead and oil to which you add a water solution to thicken it, so as to save your pigment as well as oil. It is a well known fact that when a small portion of water is added to white lead and linseed oil paint it will tend to subdue its gloss and sometimes to flatten it altogether. You further state that you use turpentine as drier, which is a fallacy, as turpentine is not a drier, but simply a vehicle that allows paint to dry flat when used in the right proportion. The same is true of benzine, and both of these solvents are employed only to liquify basic driers and not as drying agents. It is therefore self-evident that the smaller the proportion of either turpentine or benzine introduced in an oil paint, the more luster or gloss such paint will have and the more durable such gloss will be on exposure. On drying, the water and turpentine or benzine will evaporate, leaving the paint porous, and the greater the porosity in paint, the more rapid will be the disappearance of luster and gloss. Leave out your turpentine or benzine, add a small portion of zinc to your lead and use good kettle boiled linseed oil and a little japan and you will have good gloss.

— 661 —

Preparation of a Leather Varnish.

We presume that you have in view a black varnish for leather that dries quickly and with good body and gloss. If that is the case, we can give you two formulas, from which you may select, as follows:—

No. 1.

4 lbs. Dry D. C. Shellac,
 2 lbs. Gum Thus or Crude Turpentine,
 5 lbs. Manila Gum.
 25 lbs. 95 per cent. Alcohol,
 $\frac{3}{4}$ lb. Aniline Black.

No. 2.

4 lbs. Dry D. C. Shellac,
 4 lbs. Crude Turpentine,
 4 lbs. Rosin,
 22 lbs. 95 per cent. Alcohol,
 3-8 lb. Aniline Black.

Either of these may be made in the cold way by dissolving gum and rosins in the alcohol, and adding the aniline black, after it has been dissolved in part of the alcohol.

Should you desire to make simply a gloss for leather, something cheap, we would advise you to employ the following formula:—

Take one pound of good animal glue, soak it over night in cold water bath and then dissolve one pound of ordinary soap in hot water and mix it with the warm solution of glue. To dissolve either of these use three gallons of water or six gallons for both. To the mixture of the two solutions add one quart of boiled linseed oil, then one pound of good wheat starch, which has been well mixed with part of the six gallons of water mentioned above and put through a fine strainer to prevent lumping. Put this mixture over a moderate fire and boil to a fairly thick paste. It may be used warm or it may be put in a form or mold, where it can be evaporated and made into cakes or tablets, which afterward may be mixed with stale beer or water. To produce a good gloss on leather apply as thin as possible. It makes leather durable and gives it a new appearance, though not as high a gloss as the spirit varnish referred to above.

— 662 —

How to Prepare Venetian Red for Staining Brick Walls.

A painter asks: "Will muriatic acid, Venetian red and water make a good brick stain?"

We do not take any stock in your formula for a brick stain. Dilute muriatic acid is employed to clean brick of efflorescence and fungus growth, but not as a binder for a stain. You might try the following wash, which will make brick look bright and like new: Dissolve one ounce of glue and two ounces of alum, each separately in hot water, add the two solutions together and put to these enough hot water to make one gallon, with which quantity of water mix one pound of deep Venetian red. When cold strain and apply.

— 663 —

Transparent or Colorless Varnish for Marbleized Work.

It depends very much on the kind of work you are to undertake and what you can afford to pay for your varnish. For quick work dissolve:—

5 pounds refined bleached shellac, and
2 pounds clear Venice turpentine in
16 pounds 95 per cent. alcohol.

If the work is to be merely ornamental, a varnish made on the following formula will answer for interior work. It is perfectly transparent and will dry quickly:—

10 pounds Water White Rosin,
2 pounds Crude Turpentine,
8 pounds 95 per cent. Alcohol.

Or for slow drying:—

10 pounds Water White Rosin.
2 pounds Crude Turpentine,
2 pounds Spirits of Turpentine,
6 pounds 95 per cent. Alcohol.

— 664 —

Estimating Cost and Labor for Painting Clapboarding With Best White Lead and Linseed Oil.

In the following, wages are taken at \$3.25 per day of eight hours.

In order to give you an idea as to what we consider the proper material for three-coat work, we must necessarily go into details, using prevailing retail prices as basis for cost.

First coat or priming for new work:—

100 lbs. pure white lead @ 6c. per lb.....	\$6.00
6 gals. raw linseed oil @ 60c. per gal.....	3.60
$\frac{1}{4}$ gal. japan drier @ \$1 per gal.....	.25

Total for material..... 9.85

Cost for labor of mixing by hand..... .65

This will produce $8\frac{1}{4}$ gals. paint for.....\$10.50

Cost for 1 gallon, \$1.20, covering 80 square yards of clapboarding of average smoothness, costing $1\frac{1}{2}$ cents per square yard. A painter of average ability will cover 80 square yards in a day of 10 hours, and as he works only 8 hours per day, the cost per square yard may be put at 5 cents. Total for labor and material, $6\frac{1}{2}$ cents per yard. Add to this amount 50 per cent. for wear and tear of brushes, ladders, staging, shop rent and supervision and you will have $9\frac{3}{4}$ cents per yard.

Second coat to be made as follows:—

100 lbs. pure white lead @ 6c. per lb.....	\$6.00
$4\frac{1}{2}$ gals. raw linseed oil @ 60c. per gal.....	2.70
$\frac{1}{4}$ gal. japan drier @ \$1 per gal.....	.25

Total for material..... \$8.95

Cost for labor of mixing by hand..... .65

This will produce $7\frac{1}{2}$ gals. paint for..... \$9.60

Cost for 1 gallon, \$1.28, covering 90 square yards of well primed clapboarding, and the cost for material is closely on to $1\frac{3}{4}$ cents; the cost for labor is $4\frac{1}{4}$ cents; total, 6 cents per square yard, to which add

50 per cent., as above, giving a total of 9 cents per yard. The average workman should be able to second coat 90 square yards of surface in a day of 10 hours, unless difficult of reach.

Third coat paint to be made a trifle more oily, as follows:—

100 lbs. pure white lead @ 6c. per lb.....	\$6.00
4 $\frac{3}{4}$ gals, raw linseed oil @ 60c. per gal.....	2.85
$\frac{1}{4}$ gal japan drier @ \$1 per gal.....	.25

Total for material.....	\$9.10
Cost for labor of mixing by hand.....	.65

This will produce 7 $\frac{3}{4}$ gals. paint for..... \$9.75

Cost for 1 gallon, \$1.26, covering about 100 square yards one coat well brushed out, which can be done by one man in a day of 10 hours, providing he can reach all of the surface without changing staging or scaffolding. Cost for material per yard, 1 $\frac{1}{2}$ cents; labor, 4 cents; total, 5 $\frac{1}{2}$ cents. Adding the 50 per cent., as above, will make 8 $\frac{1}{4}$ cents.

Therefore estimate should be based on 9 $\frac{3}{4}$ cents for first coat, 9 cents for second coat and 8 $\frac{1}{4}$ cents for third coat, or for three-coat work 27 cents per square yard.

For very rough surface the cost for material should be doubled, at least, in estimating, and where a great deal of staging or scaffolding is required the extra labor for this should be considered. An allowance of at least 10 per cent. additional should be made—more if necessary—in measuring clapboarding, as well as for the windowsills, frames, etc. In order to come out whole on a bid the contracting painter must exercise his best judgment at all times.

— 665 —

How to Apply Flock Properly to Cut-in Signs.

Proceed in the same manner as you would in smalting a sign; be particularly careful that your groundwork is dry and hard and not too flat, so that the flock will not stick to the letters. The color you cut in with must be heavy and slow drying, but not fat or greasy, or it will spread and produce ragged edges. Bear in mind, however, that flock should be used for sheltered signs only, and not for those that are exposed to the weather.

— 666 —

To Close Up Cracks in Brick or Stone Walls to Keep Out Moisture.

You have, no doubt, in your shop some paint skins or the remnants of linseed oil paint from paint pots. Take the oiliest or softest of this and run them through a paint mill or strainer. Fine grinding or straining is not required. If not thin enough for a mixed paint, add the foots of your oil tank or oil barrel, until you have such consistency. Now work in enough of dry common whiting to make the mass about as stiff as glazing putty and then add to it enough good Portland cement to enable you to handle it without it sticking to your hands. In that condition it may be pressed or worked into cracks in stone or

brick walls, and when it has become hard it will be adhesive and will not be penetrated by moisture, and will stand any reasonable degree of heat as well.

— 667 —

Filling for Brass Signs.

A cement for filling the letters of brass signs may be made by mixing equal parts of asphaltum, shellac and lampblack. Black sealing wax will also answer the purpose. Apply by heating the brass plate, melting the cement in, then even up the surface with a warm iron. Then scrape off the surplus carefully, and once more hold a warm iron over the letters to glaze them.

Another method is to mix asphaltum varnish, brown japan and lampblack to the consistency of putty, press this firmly into the spaces, then clean the edges with turpentine. When dry and hard, the whole plate can be polished.

— 668 —

Putty for Raised Work on Picture Frames.

Bolted gilder's whiting and glue and water solution are worked together into a stiff putty, which is pressed into an oiled mould. To make it dry slowly, a few drops of glycerine are added to the putty.

— 669 —

The Difference Between Asphaltum and Black Baking Japan.

The letters "B" and "T" in front of the word asphaltum simply define the solvent used to make the varnish, B standing for benzine and T for turpentine. Asphaltum varnish is similar to these, and may mean either or may be used to designate a black varnish of greater elasticity, i. e., containing more linseed oil. Black baking japan is usually made from a higher and harder grade of asphaltum with linseed oil and driers, and thinned with turpentine or a mixture of linseed oil and benzine. We annex a few formulas, as requested, but will not be responsible for satisfactory results, because some practice is required to bring these about.

"B" Asphaltum.

35 lbs. Trinidad asphaltum.
1 gallon heavy boiled linseed oil.
9 gallons 62 degrees benzine.

"T" Asphaltum.

30 lbs. Trinidad asphaltum.
1 gallon heavy boiled linseed oil.
7 gallons turpentine.

To cheapen the "B" asphaltum, ordinary rosin may be introduced in connection with the asphaltum, say equal parts of each. The same can be done with the "T" asphaltum. The asphaltum or it and the rosin is melted over a good fire in a suitable kettle and the drying boiled oil added while stirring. When boiled for about an hour, the kettle is taken from the fire to a safe distance and then the mass is thinned under constant agitation with the solvent.

Elastic Asphaltum Varnish.

30 lbs. Syrian or Egyptian asphaltum.

2 gallons heavy boiled linseed oil.

8 gallons turpentine.

To make, proceed as above.

Black Baking Japan.

40 lbs. Syrian asphaltum or gilsonite.

10 gallons hot linseed oil.

8 lbs. litharge, bone dry and pulverized.

8 lbs. red lead, bone dry and pulverized.

3 lbs. vitriol of zinc, bone dry and pulverized.

30 gallons turpentine.

To make this japan successfully, it is necessary to have kettles on wheels, so that they may be removed from the fire quickly. In one of the kettles heat slowly ten gallons of good, well settled linseed oil, in another kettle, which must be provided with a cover, melt over a good fire the forty pounds of asphaltum of gilsonite, and this done, add the ten gallons of hot oil to the mass and boil for fifteen minutes longer. Now put the kettle over a slower fire, which must be kept uniform, then add in small doses, while constantly stirring, the dry powder. When all the driers are added, the kettle is allowed to remain on the slow fire for four hours and then removed to cool off. This ends the first day's operation. Next morning the kettle is put again over the fire and the mass brought to a boil. Now the mass is tested on glass, and if it does not become so brittle that it will not stick to the fingers on cooling, it must be boiled until this stage is attained. At this point again remove the kettle from the fire, let it stand for an hour or ninety minutes to cool off somewhat, then thin the mass down with turpentine to proper consistency. If too stout, warm it up again some and add more turpentine. This japan will dry in the air in eight hours and bake hard in less than two hours.

— 670 —

Raised Letter Signs of Plaster of Paris.

A Minnesota sign painter made raised letters of plaster of paris, varnishing and gilding them. They stood well for two years, when they began to show signs of cracking. He used dental plaster.

Your method, as you describe it, is quite ingenious for highly raised letters, and in order to keep the plaster from cracking in future, we would advise you to mix it as you did before, but add to every pound of dry plaster one ounce of powdered marshmallow root, which will keep the plaster from setting too quick, allowing you to work it for quite a while. It becomes very tough on drying without being brittle in the least. Instead of filling it with varnish, before gilding, give the surface a coat of linseed oil, and do not put on your size for the leaf until the oil has dried, free of tack. If you wish to use plastico in place of plaster of paris, dissolve one pound of glue in one gallon of water, stir in the solution two pounds bolted whiting, two pounds of plaster of paris and one pound strictly pure white lead in oil. If too thin for your use, thicken with whiting. This plastico will require twenty-four hours to dry, but when thoroughly dry and hard, it may be varnished, painted or gilded.

— 671 —

Painting Steampipes and Radiators.

Some steam coils were painted light buff, while cold, with a mixture of white lead, chrome yellow, oil and turpentine. The steam was turned on immediately after the application of the paint, which peeled off.

Your treatment of the pipes was not the proper one to follow. In the first place, your pigments were not of the right selection, because white lead and chrome yellow will invariably turn brown on heated steampipes, and in the second place, an oily paint will blister under these conditions and at the same time darken the color still more. It requires zinc white as a base for such paint with a coloring matter that is not easily affected by great heat. For a light buff, we should use raw Italian sienna for coloring matter, and if this should make too dark a buff, add some zinc yellow (permanent yellow). The zinc white should be of best quality, preferably ground in damar varnish, or if ground in linseed oil, it should be washed with turpentine to extract the surplus oil. The colors should be ground fine in oil or in japan, it does not matter which, because it requires but little for a light buff tint. The white and colors should then be thinned to a creamy consistency and to this mixture a good pale baking varnish added in sufficient quantity to make a glossy paint. If such paint is applied when the pipes are fairly cool and the steam turned on, when the paint is about to set, no apprehension need be felt as to the result, because the paint will bake onto the pipes, neither blistering, peeling, cracking nor chipping. But even here, the steam should not be turned on in full force until the paint is dry or hard to the touch. For other tints than light buff, we would suggest such colors as ultramarine blue, drop black, burnt sienna, red oxide or Tuscan red, Indian red, yellow ochre, chrome red, madder lake, as they may come into use, but beware of chrome yellow, chrome green, Prussian blue, etc.

— 672 —

How to Obtain a Dull Finish on a Hearse.

We assume that you know how to paint a hearse in black or white from the raw wood to the final coat of finishing varnish and, therefore, omit going into details. When you have rubbed down your color and varnish coats and applied the final coat of finishing varnish, allow it to stand at least one week or ten days, if possible, then rub lightly with pumice and water and finally with rotten stone and sweet oil, until you have obtained the dull polish desired. Clean up with soft woolen cloth.

— 673 —

Aquarium Cement of the Best Quality.

Mix two heaping tablespoonfuls of finest powdered litharge with one tablespoonful of glycerine, which must be as viscid as heavy syrup. If you cannot obtain it of that consistency, you must evaporate the less heavy glycerine of commerce on a water bath, until it is viscid. Use same as any other putty.

— 674 —

Lightning Driers as a Size on Whitewashed Walls and as a Drying Medium for Inside Work.

Lightning drier may be used as a size for whitewashed walls that are to be painted, but under no condition should it be used where such walls are to be papered. For this purpose a glue and alum size or a wash of vinegar is best, for the first named purpose a suction varnish would be preferable to lightning drier. In either case all the loose whitewash should be removed with a stiff broom.

White lead in oil, tinted with oil color and thinned with turpentine and lightning drier will make a good, flat finish for interior walls and woodwork, and benzine may be substituted for the turpentine, but we should much prefer the latter as the proper thinner, because of the odor and better working quality of a paint made with turpentine.

— 675 —

Cleaning and Renovating Oil Paintings.

To clean and restore oil paintings a very good method is to cover them with wet cloths for three days, changing them twice daily, and washing them at each change. When clean and dry, rub the painting over with a soft cloth, saturated with nut oil.

Another method is to clean the painting thoroughly and then glaze it over with a good mastic varnish, made as follows: Dissolve 14 ounces gum mastic in three pounds spirits of turpentine in a water bath, and then add two ounces clear Venice turpentine or Canada balsam. Put into a flask or jar and add one-half pound powdered glass or quartz. Shake thoroughly and allow to clear by settling. When clear, decant and apply with a soft varnish brush.

— 676 —

Difference Between Spirits of Turpentine and Venice Turpentine.

Spirits of turpentine and oil of turpentine are one and the same article. In the United States the former term is used, in Europe the latter. It is the volatile liquid obtained by distillation from the crude turpentine, a resinous exudation from various species of pine and other coniferous trees, which, when distilled with steam, are decomposed into the volatile spirit, known as turps, and a solid residue, known as rosin or colophony. The crude turpentines, known as Venice turpentine, Strassburg turpentine or Canada balsam, are of a soft, resinous character, of the consistency of honey, and of an aromatic odor, and are mostly used for medicinal purposes and classed as balsams. What little is used of these goods in the paint and varnish line is employed by artists and by varnish manufacturers to make spirit varnishes flow more freely. True Venice turpentine or Canada balsam should be fairly clear, but not quite transparent, of a yellowish or slightly greenish color, and have a pleasant aromatic odor. If light brown in color, it may be set down as a mixture of resin and turps.

— 677 —

Best Paint for a Light Canoe Exterior.

That depends very much on the color desired. If it is to be a clear white or a light tint, we should say give it a coat of white lead; or white lead with coloring matter to suit, if a tint is wanted. Thin the lead with two parts raw oil and one part turpentine, with only enough drier to make this coat dry hard in twenty-four hours. Have your second coat made of equal parts of pure lead and pure zinc white, cut with a little drier and turpentine and thinned with good spar varnish. If chrome green or olive green or similar color is desired, thin your color for first coat with equal parts of raw linseed oil and turpentine, adding enough drier to make it set up over night and to be hard enough to receive the second coat in from thirty-six to forty-eight hours. Thin the color for second or finishing coat with a good japan or liquid drier and turpentine, and add enough of good spar varnish to produce good gloss. This applies to all solid colors, such as chrome yellows, Indian reds, Tuscan reds, black, etc. When the job is in a hurry and quick work paramount to durability, a good, hard drying, rubbing varnish may be used in place of spar varnish.

— 678 —

Blistering of Paint Caused by Water.

A house was painted during November and December with three coats of pure lead and oil. Where the inside was plastered and allowed to dry, without fire, until February, the paint shows water blisters.

We believe that in this case the blistering was due to the plastering, although it may have been caused by dampness in the foundation. Still, inasmuch as you say that the paint blistered only on the siding which was plastered inside, it is very reasonable to assume that the water in the plaster soaked into the wood and caused the paint to blister, because there is enough water present in plaster to dampen the wood to which it is applied. The lumber may have been green enough to help matters along. At any rate it will be risky to repaint unless the paint is removed with a paint burner, which will assist in removing any dampness that may be still in the wood.

— 679 —

Floor Finish for Soft Wood Floors.

Soft wood floors are naturally much more difficult to prepare and keep in order than those of hard wood, because the wood itself is so much more subject to being marred. If paint cannot be used on such floors we are of the opinion that they should be colored with an oil stain and puttied up with colored putty that matches the stain. On top of this two coats of shellac varnish should be applied, and over this at least one coat of good, hard drying floor varnish. This is rather expensive, but the best method we know of. Hard wood floors are generally filled with hard wood filler, then puttied up and waxed

with wax floor polish, unless expense is not considered, when they are filled, puttied up and treated with several coats of shellac, rubbed and finished with high grade varnish and then polished.

— 680 —

Removing Grease Spots from Wall Paper.

Calcined magnesia or carbonate of magnesia is mixed into paste form with soft water and applied to the spots with a soft brush. When the mass is dry it is carefully removed with a sharp knife, and if the spots are not entirely removed, the operation is repeated until the object is accomplished.

— 681 —

Paint and Varnish Removers and Their Effects.

A sample of paint and varnish remover, in the original package, was received with a request to have it tested and to have a candid criticism of it.

We had one of our friends—an old veteran in the painting profession—interested in the matter, and he has given us a full report, which is as follows: I have tried the paint and varnish remover which you requested me to give a fair and impartial test, but please do not ask me to do a similar job for you again, for I came very near losing a very good customer, a man who owns quite a lot of real estate in my town. I was called to refinish a bathroom in natural wood for one of his tenants and thought there was a good chance to use the remover. I followed directions closely, applying the material to the surface to be cleaned off thickly with a brush, and the brush was not injured at all, as my experience has been with other removers, and in less than one hour's time I had all the varnish off and apparently part of the paste filler also. I used turps for washing down the woodwork, getting the old varnish, etc., well out of the mouldings, too, and was proud of the job.

But during the operation, while the odor was not unpleasant, somewhat like that of carbolic acid, I had inhaled fumes not unlike those of wood alcohol or something even stronger, that filled up my lungs, creating a very noxious sensation that I could not get rid of for several days after I had the job refinished. I had no idea, however, that the tenants of that dwelling would make such a howl over the matter as they did. The head of the family called on my patron, the landlord, and threatened to move and sue for damages, as I had poisoned the whole family, and so forth, and it took the owner quite a while to pacify the angry tenant. As a matter of course, I came in for a goodly share of the abuse from all hands concerned, and have made up my mind that before using any other nostrum of that sort, no matter how high sounding its name, I shall use the good old standby ammonia and turpentine or the oxalic acid solution, no matter how much slower the work may be. This paint and varnish remover may be good enough for exterior work, but I shall depend on the gasoline burner, wherever I can, and where a slight raising of the grain of the wood or a discoloration of hard wood is harmless and the burner cannot be used, I shall use the concentrated lye remover.

There should be a law compelling the manufacturers of this material to plainly state on the label that the contents of package are poisonous, and should be used with the utmost caution. As far as I could ascertain by examination, the material is composed of a soft vegetable wax, carbolic acid, wood alcohol and mineral oil. It does not affect the grain of the wood, nor the bristles of any brush, but the fumes seem to penetrate every pore of the human system.

— 682 —

Repainting the Body of a Carriage Without Removing the Old Paint.

Scrape off all of the varnish down to the color coats with a carpenter's scraper, about two inches wide, then cut down with sandpaper until you have a fairly smooth surface and dust off. Now give a coat of white lead, tinted with lampblack and thinned with one part japan, one part oil and two parts turpentine. Allow this to stand forty-eight hours, and putty up where required; then give another coat of rough stuff and putty up again. After this give two more coats of rough stuff, apply your guide coat and rub, proceeding as you would on new work. By this method you will fill up whatever cracks there may have been in the old color coats, and obtain a good wearing job.

— 683 —

Best Paint for the Outside of White Pine Water Tanks.

Trouble was caused by paint peeling from outside of white pine railway water tanks.

We are afraid that no paint, especially linseed oil paint, can be made that will last for any great length of time under the conditions referred to in your question. The tanks being permanently filled with water, the moisture of course is permanently in the staves, which keeps the paint on the outside soft in the priming or undercoat, while the sun and atmosphere make the outer coat brittle and causes the whole to peel. Should suggest, however, that a priming and first coat of red lead paint would answer best, with a finishing coat of your regular yellow paint.

Take for priming dry red lead, mixing it with three parts raw linseed oil and one part coach japan, and for the first coat, over the priming, also use a mixture of dry red lead and equal parts raw oil and coach japan, to which perhaps a trifle of turpentine may be added to make it spread well. Allow plenty of time for hardening between coats, and you will have a tough, cement-like surface, which will not be affected by moisture, like your regular paint, and your yellow paint will cover well over this groundwork.

While we cannot guarantee absolute durability for this process of painting, we have found it the best in our experience.

— 684 —

Cleaning Brick Walls That Have Become Spotted with Mortar.

Knock off the lumps of mortar with a scraper, also scrape off the mortar spots, where they are heavy, and remove balance by sponging with a mixture of equal parts commercial muriatic acid and soft water,

which will soften and remove the mortar. Finally wash down with clear water. This proceeding will also remove the white efflorescence, as well as dirt from bricks, making them look like new.

— 685 —

How to Prevent Moistures Striking Through Brick or Plastered Walls.

Whenever a driving rain strikes the outside of a brick wall, the inside of which has been plastered directly on the brick, the wall paper becomes damp and comes off.

After a prolonged dry spell, which has given the wall a good chance to dry out, put on a good coat of oil paint, which will soak well into the bricks, then putty up the joints and all the holes that may be in the bricks with glazier's putty stained the color of your paint. When this is dry, give a second coat, not quite as oily as the first and finish off with a coat of flat brick color, or if this is undesirable, with a good glossy oil paint.

— 686 —

Preparing Whitewashed or Kalsomined Walls for Kalsomining.

Glue and alum size had been successfully used in preparing for kalsomine some walls and ceilings that had been previously whitewashed or kalsomined; while on other walls the size had no effect.

We think that where your glue and alum size failed, the walls or ceilings were in extraordinarily bad condition, most likely greasy and smoky, and required washing with soap and water for the kalsomine and weak vinegar for the whitewash. However, the failure of your size in some cases may have been due to the quality of your glue. Good glue must swell in cold water, but not dissolve in it, nor should it dissolve too readily in hot water, without being first soaked for an hour or two in cold water. Much of the white glue on the market is very inferior, being mixed with starch or clay. We should advise you to try a size made as follows: Dissolve one pound of good glue, one pound of bar soap and two pounds of pulverized alum, each separately in one quart of boiling water, first having soaked the glue. Mix the glue and soap solution thoroughly, then add the alum solution slowly, stirring continuously. Add enough cold water to make it of the right consistency. For whitewash it should be made thinner than for kalsomine, so as to soak in deep enough to hold the whitewash.

— 687 —

To Make Plush Adhere to Metal Permanently.

Plush was to be fastened on the bottom of certain heavy tin boxes to prevent scratching the tops of tables on which they were placed.

Wash off with ordinary soda water the bottom of the tin boxes, wiping it dry with cloth. Coat tin with the juice of onion and press on this space a piece of fairly strong paper, smoothing it out so that there will be no blisters. When this has dried, the paper will adhere so that it can be removed only by scraping with a sharp instrument. Now give a coat of hot glue to the paper and press your plush down into the glue, and when dry and hard, the plush can be removed only by placing the tin box in boiling water.

— 688 —

Cement for Articles of Celluloid.

To fasten celluloid to wood, tin, etc.

Dissolve two parts by weight of white or orange shellac in four parts by weight of 95 per cent. grain alcohol and three parts by weight of spirits of camphor. This will make a tough binding medium between the various articles, but the tin must be first washed with soda water and wiped dry and clean to free it from grease.

— 689 —

Removing Varnish or Floor Paint from Hardwood Floors.

Take caustic soda or concentrated lye and dissolve the same in boiling water, keeping the solution hot while applying it. Have rubber gloves on your hands while you make or use the solution, and apply it with a cotton swab, because it would ruin brushes. Oil paints can be removed in a few minutes and varnish paints or varnishes will yield in from ten to fifteen minutes. When the wood has been cleaned of paint or varnish, it must be well washed with clear water, and if the wood has darkened from the action of the soda or lye solution, and this be objectionable, in case the floor is simply revarnished and not painted, the darkening can be corrected by brushing dilute muriatic acid over it, and when the wood has resumed its natural color, it should be thoroughly washed with clear water and finally with weak soda water to neutralize any traces of acid still remaining. For applying the acid use bristle brushes that are not bound with iron wire. Muriatic acid should not be used, where iron or steel articles are lying about, and in using the soda lye, linen or cotton clothes should be worn, as a single drop of the solution will burn a hole through woolen goods.

— 690 —

Repainting Bicycles with Air Drying Enamel.

As the cyclists do not give the repairer much time, we do not think that air drying enamel will answer, because if made to dry too rapidly and hard, the paint will chip or scale at the lightest touch, while, on the other hand, if made to dry slow enough to remain elastic, the paint will become tacky or at least be too soft to be of good service. Bicycles, like carriages, often become splashed with mud, which, in many cases, is allowed to dry hard, and then takes some scrubbing to remove. This is not good for air drying varnish paint, because road mud has usually caustic properties, which will destroy paint, unless it is well baked on the enameled article. Most repair shops, therefore, as well as the factories, have their bake ovens and bake every coat from six to eight hours at from 200 to 300 deg. F. At a certain repair shop known to the writer the work is done as follows: The frame is first cleaned down by burning off the old enamel, then sandpapered smooth and washed with gasoline, then placed in the oven for six hours to burn off any remaining grease, taken out again and washed with gasoline. When the first coat of enamel is applied it should be allowed to set, and then baked for six hours at about 250 deg. F. When cooled, it

should be rubbed down with steel wool. The finishing coat should be baked for eight hours at 200 deg. F., and then rubbed down with a soft rag, then the varnish applied and baked eight hours at 200 deg. F.

The frame must be allowed to heat and cool gradually, because the enamel is soft when hot. It is best to apply the enamels with soft brushes and give 300 deg. F. for black, and 200 deg. F. for colors, while white should be baked at between 170 and 180 degs. F.

— 691 —

Cheap Paint for Rough Shed.

The following recipe has been published for making a cheap paint that looks and wears fairly well on rough or weatherbeaten surface: To a peck of lime, add before slaking three-quarters of strong rock salt brine and two pounds tallow and color with such dry earth colors as yellow ochre, raw or burnt sienna, Venetian red or umber. Remember, however, that the material will dry out three or four shades lighter. Slake the lime with the required color in, let cool and apply with whitewash brushes. The tallow will make the wash waterproof and the salt hardens it.

— 692 —

Ebony Stain for Floors.

Boil one pound of logwood in one pint of water until the water is strongly colored. Give two coats of this decoction to the floor, applying it evenly and uniformly. This dry, go over it with a solution of copperas in water. A good black stain will be the result, which, after sizing, may be varnished, but rubbing it with a polish of beeswax and turpentine gives a still better effect.

— 693 —

Removing White Spots from Bricks and Terra Cotta Trimmings.

From your statement that only one of the two kinds of terra cotta bricks used in the front show white spots, it is evident that the efflorescence is due to mineral salts in the brick and no matter what neutralising agent you may employ, the spots will appear again and again, so long as there are soluble mineral salts in the material from which the brick or terra cotta facing is made. You can remove the white spots by sponging the surface thoroughly with a mixture of equal parts of hydrochloric acid and water, and afterward washing down with clear water, but in nine cases out of ten the spots will reappear after a driving storm, because the moisture sets free more of the salts, which have not been fully neutralized by the dilute acid. The best preventative, after the front has been sponged with the solution, washed down with clear water and allowed to dry thoroughly, would be the application of two or three coats of good oil paint, the finishing coat of which might be held flat.

— 694 —

Filler for Canvas or Muslin Banners.

A filler for canvas or muslin banners was wanted, that should be more economical than white lead and should stand exposure to the weather.

You, no doubt, use glue size before you apply your white lead. As banners must be painted with an elastic paint, we would not advise you to use any other white material but white lead, nor would we advise you to use any of the so-called graded leads for this purpose. But as political banners are not required to hold out much over one campaign, why can you not make a mixture of pure keg lead and fine bolted whiting in the proportion of 70 to 30?

— 695 —

Durable and Fireproof Shingle Stains.

We cannot give you any formulas for a fireproof shingle stain, and do not believe that such a material can be made, though fireproofing of wood under pressure has been accomplished with fairly satisfactory results. But it is nonsensical to believe that simply dipping shingles into a stain will make it fire-resisting, as it stands to reason that a stain to penetrate sufficiently to make it durable must contain the necessary binder, which, as a matter of course, must not consist of water. As for making a sea green shingle stain, we would advise use of Prussian blue, Dutch pink and yellow ochre, all finely ground in linseed oil, thinned down to a semi-paste with boiled linseed oil and liquid drier and finally reduced with benzine to proper consistency for dipping. The thinner the stain, the more will it penetrate into the wood. In place of the benzine, or, at least, in place of part of the benzine, creosote or coaltar naphtha may be employed to preserve the wood and prevent fungus growth.

— 696 —

Paper Hangers' Paste That Will Keep in Hot Weather.

We do not know of any paper hangers' paste that can be made up of any cheap substance that will thicken or body up the paste and yet and keep from souring for several months, nor do we know allow it to retain its adhesive qualities. The following formula is the best we know of and will keep for a long time; how long depends on the care with which it is made and where stored. If mold forms on top, it will do no harm; this may be taken off and the remainder used. Sift four pounds of wheat flour, beat it up in enough cold water until all lumps disappear, then add enough cold water to make a soft batter; have two ounces of powdered alum dissolved in hot water and stir this into the batter. Have a kettle of boiling water ready, take from fire and pour into the batter, while continually stirring; when the batter swells and loses the white color of the flour, the paste will be ready. This paste will suit for all ordinary conditions, but where great adhesiveness is required, the cold batter should be made as above and to this quantity one-half ounce of powdered rosin and one ounce of pulverized sugar of lead be added, the whole placed over a moderate fire

until it begins to boil, when more water is added and the mass constantly stirred until it thickens, when it is set away to cool. This paste will answer for painted or varnished walls, and before using should be thinned down with a weak gum arabic water.

— 697 —

Filling and Varnishing Oak So That It Will Not Show Pitting.

If your finished surface shows pit marks, the fault is either in your filler or in the way you use the same. Perhaps you wipe off too soon or wait too long. When you use prepared paste filler, apply it as per directions, but always use a good brush. As soon as the filler begins to set or show flat, begin to rub it into the grain of the wood with a pad made of medium soft leather glued on to a block of wood, working across the grain. The object is to get as much of the filler into the grain as possible. It is important to wipe off the surplus filler before it becomes too hard. Sometimes two coats of filler are required when the wood is very open. Give it plenty of time to dry hard, then apply at least one coat of white shellac and rub down with No. 1 sandpaper, after which apply at least two coats of varnish, the first coat to be rubbed down with curled hair. The shellac may be omitted, but in that case a coat of quick-drying varnish should be given in its place. The cost for material per square, for filling and three coats varnish (one coat shellac or rubbing varnish and two coats finishing varnish) we would place at \$1.75, while we should say that the minimum of labor per square will be twelve hours, and for high-class work not less than twenty hours. But you can determine this for yourself far better than we can, because there is a vast difference in the ability of workmen.

— 698 —

How to Prepare Smalted Signs on Wood or Tin.

To smalt a color or gold letter sign on wood or tin, prepare your ground so that it dries with an eggshell gloss that will not allow the smalts to stick to it. Cut in around your letters with heavy color of same shade as your smalts, but do not have it fat or greasy, or it will spread and make ragged edges. Your color for cutting in must be slow drying, however, and for black it is best to use lampblack in oil, to which a little good drier is added. When you have cut in your sign, lay it on bench with large pieces of paper under it to catch the surplus smalts, put your smalts in a sieve of proper mesh and sprinkle until the entire surface is covered, then turn over the sign to remove the loose smalt and let stand aside to dry. There is no special size required for smalting a sign, the binder to hold the smalts in place being the heavy, slow-drying oil color mentioned above.

— 699 —

Black Paint for Locomotive Fronts.

All locomotive painters appear to agree that there is no paint made or will ever be made which will stand any length of time on the overheated parts of a locomotive, as, for instance, the firebox, while lamp-black ground in a good engine finish will stand about the longest.

Many have suggested painting these parts with graphite and linseed oil, others with lampblack and oil, allowing it to burn off and then letting the attendants go over the surface daily with oily waste, thereby producing a fairly glossy black surface.

— 700 —

Substitutes for Linseed Oil and Their Value.

We are sorry to say that we cannot tell you of a good substitute for linseed oil, as we should be very glad ourselves to find or know of something that would actually take the place of that paint medium, and yet cost us only one-half or one-third as much.

The fact is that the oils that are as good and in some respects better than linseed oil cost as much or more than the latter, while some of the practically non-drying oils that are cheaper at first cost and might be substituted require more drier, costing as much in the end, besides being deteriorated still more by the use of so much driers. By using cheap oil you may be successful in securing contracts for a time, thereby undermining the existence of your brethren in the craft, but unless you wish to go out of business at an early date, or desire to be looked upon with disdain, you had better think twice before basing your estimates on the use of rosin oil, petroleum or japan oils and the like.

We are opposed to the use of all nostrums, and cannot give you any information on the composition or pass any opinion on the comparative value of the paint oils you name. The very best way for you to determine their value is to make tests of them in comparison with pure raw linseed oil, using the same base or paste with all of them, applying a similar number of coats to raw wood, giving the test boards a severe exposure. It will not require many months to tell the tale, and convince you that in order to sustain reputation in business honesty is the best policy, and honest linseed oil the best paint oil.

— 701 —

Composition of Various Colors and Tints.

Many of the names given are those of the aniline type or coal-tar colors, but we will do our best to give an idea how they may be compounded from the more or less stable pigments. As pigments vary so much and differ so widely in point of strength we shall not attempt to name quantity of each required to produce them. However, as you have not mentioned whether you have water colors or oil colors in view, we would caution you against the use of white lead in making tints for distemper work, while you may take your choice between white lead and zinc white for making tints in oil, always thinking of the fact that zinc white will produce the cleanest tones and is not so apt to darken tints on interior work:

Absinthe Green—Pale French paris green and white.

Auburn—Indian red, drop black and Venetian red.

Azure Blue—In oil, cobalt blue and finest zinc white; in water, Bremen blue and little zinc white.

Bay—Burnt umber, Dutch pink and Venetian red.

Beaver—Drop black, not blued, and burnt umber.

- Cafe au Lait—White, burnt umber, med. chro. yellow.
 Chestnut—Burnt umber, ivory black, yellow ochre.
 Chocolate—White and burnt umber, with trifle yellow.
 Damask Red—Rose madder or French carmine and a trifle scarlet lake or vermillion.
 Dove Wing—White, ultramarine blue and drop black, with tinge of red lake.
 touch of bronze red.
 Electric Blue—Chinese blue and ultramarine blue mixed and a
 Electric Green—Electric blue and lemon chrome.
 Electric Turquoise—White, electric green and electric blue.
 Egyptian Brown—Asphaltum for glazing or for solid work: Ivory black, not blued, and burnt umber.
 Fawn Pink—White, drop black or raw umber, vermillion and chrome yellow.
 Gothic Blue—Indigo or Chinese blue free of bronze, white and drop black.
 Golden Russet Olive—Lemon chrome yellow and light Venetian red or burnt sienna.
 Heliotrope—Carmine lake and white.
 Jonquil—White and lemon chrome yellow.
 Isabella—Med. chrome yellow, burnt umber, Venetian red.
 Mauve—Rose madder, ultramarine blue, white.
 Morella—Rose pink, with trifle drop black and white.
 Muddy Amber—Burnt sienna, chrome yellow, drop black.
 Mulberry Red—Yellow ocher, burnt sienna, white.
 Murrey—Dark Venetian red, toned with red lake.
 Old Blue—White, Prussian blue and trifle yellow.
 Old Ivory—White and raw sienna.
 Old Pink—White, rose lake and raw amber.
 Old Red—Tuscan red and drop black, trifle white.
 Old Rose—Rose madder or carmine, white and trifle drop black.
 Pearl Drab—White, ultramarine blue, drop black, Venetian red and ocher.
 Parrot Green—Ultramarine blue, Dutch pink and lemon chrome yellow.
 Pompeian Red—Dark India red and red lake, or a good deep Tuscan red.
 Puce—Vandyke brown or burnt umber and drop black, with a trifle chrome yellow or ocher.
 Roan—Unblued ivory black and burnt umber.
 Russet Yellow—Orange chrome, white and burnt sienna.
 Shrimp—White, raw sienna and a trifle vermillion.
 Sorrel—Orange chrome, with Venetian red, or vermillion and ocher.
 Tan—White, burnt umber, yellow ocher and Venetian red.
 Tuscan Brown—Tuscan red, yellow and drop black.
 Tuscan Drab—Tuscan red, white and drop black.
 Vandyke Drab—Vandyke (Cassel) brown, white, ocher and drop black.
 Vellum—This effect can be produced in oil by the use of strongly boiled linseed oil.

Warm Olive—Gold ocher and raw umber, with a trifle drop black.

Warm Olive Green—Medium chrome yellow, raw Turkey umber and ivory black.

Warm Russet Olive—Orange chrome yellow, burnt sienna and raw umber.

In the foregoing we have grouped the pigments so that the colors of which the greatest portion is required always heads the list and the one of which least is wanted is last named.

— 702 —

How to Secure a Dead Finish on Enamel.

Whether the job is in white or in a tint matters but little; the treatment is the same, but you can do away with the necessity of rubbing by having the next to the last coat fairly glossy and holding your finishing coat flat. Take French zinc white in poppyseed oil, mix it with turps and allow to stand, say, over night, and pour off the oil drawn out by the turpentine, then add some good paste drier and thin again with turpentine, running the result through straining muslin. See that the previous coat is perfectly free from the dust and specks, and apply the flat finish quickly and evenly. This will make a perfectly dead flat finish, and if an ivory tint is wanted, use good raw sienna and a trifle French yellow lake ground in japan for tinting the zinc white.

Should you want to change old enameled surface to a dead finish, and such old surface is free from checks and fissures, simply clean down the surface and moss it with pumice, water and curled hair, then allow to dry and apply a flat coat as suggested above for new work.

— 703 —

Stippling Church Seats That Are Stained and Varnished.

You cannot stipple over a varnished surface, because stippling is always done with water color. In graining the stipple is always applied directly on the ground, the dry color being mixed as a rule with equal parts of water and stale ale or beer, rubbed on with a sponge in small spaces at a time and pounced or stippled with blender or dry brush. When all the surface has been thus stippled and become dry, it is coated with a mixture of oil, japan and turps in equal parts, and this dry, the graining color is applied, and when this has been worked out and dried, the varnish coat finishes the job. In your case the stipple should be applied after the oil or water stain has been rubbed out with a cloth to show the grain of the wood and allowed to dry. Your stipple should be burnt umber mixed with stale ale or beer for walnut, and burnt sienna mixed in similar manner for cherry, and so on, applying it with a sponge lightly and pouncing quickly with a walnut stipple or a colander, and when dry varnish over. It requires some practice and judgment to do this work neatly.

— 704 —

How to Prepare Plaster of Paris Ornaments.

If your molds are made of wood or plaster, they should be coated with shellac varnish first, so as to prevent all suction, but this coating must be thin and evenly applied, so as not to fill up fine lines in the model. Next a coat of a mixture of oil and soft soap is given, which will allow the cast to come out of the mold readily. Plaster molds that are not to be oiled may be made non-porous with one or more applications of a strong size of soap. Molds or models of metal that have a smooth surface require no coating, while models, such as antique marble ornaments, that must not be oiled in order to prevent spotting, may be covered with very thin tin foil before taking a cast.

To be successful in making plaster ornaments the following points must be observed carefully: The mold must be so constructed that the cast can be removed without breaking any of its fine lines, that molds of wood or plaster must be shellacked to prevent suction, and greased with a mixture of non-drying oil and soap, that the plaster must be carefully selected and its quality ascertained by making a test in a small way. When mixing the material for a cast, the water must not be poured on to the plaster, but the plaster must be slowly stirred into the water until the proper consistency is obtained, which method prevents lumping. To slow up the hardening of the plaster cast, a saturated solution of borax is employed in place of clear water. One part of solution to twenty parts water retards hardening ten minutes, one part of solution to ten parts water retards hardening for forty minutes, while equal parts of solution and water will retard the hardening for at least eight hours. A saturated solution of borax is prepared by dissolving borax in boiling water and after allowing the solution to cool, pouring off the clear liquid from the crystalline sediment, this liquid constituting a saturated solution of borax in ordinary temperature.

Borax retards the rapid hardening of plaster, but the addition of marshmallow root not only retards quick hardening, but toughens the mass in a remarkable degree. Two to four per cent. by weight of finely pulverized marshmallow root added to 96 or 98 per cent. of plaster of paris and worked into a paste with 40 per cent. water will not allow the mass to harden for one hour, and make it so tough that when finally hardened it may be cut, turned, filled or drilled. A larger percentage of marshmallow root will retard drying and hardening still more and impart still greater toughness to the mass, so that it may be rolled into thin sheets on glass plates with an ordinary rolling pin, that will not crack on drying and may be rubbed to a polish. After drying this mass may be colored with water colors, varnished, rubbed and polished and by such process made water proof.

— 705 —

How to Fasten Celluloid to Other Articles.

Take two parts by weight of bleached or orange shellac, according to your necessities as to color, three parts by weight of spirits of cam-

phor and four parts by weight of 95 per cent. grain alcohol, put all in a well stoppered bottle, shake frequently and when the shellac has dissolved it is ready for use as a cement to fasten celluloid to wood, tin, iron or other metal, and also to glass.

— 706 —

To Fasten Cloth to Stone to Adhere Permanently.

There is no composition known to us which would hold cloth on polished marble or other stone, because the polish would not permit adhesion. But by taking a coarse file or rasp and going over the polish to roughen the surface, and then warming the same by placing hot sand upon it, the job can be accomplished in this manner. Remove the sand before it becomes cold, then give the warm surface a good coat of ordinary joiner's glue and place your cloth down quickly, pressing down hard and smoothing it out from the center toward the edges. When the glue is hard, trim the edges.

— 707 —

Economy in Repainting Much Worn Surfaces.

A number of badly weather beaten houses that had not been painted for years were to be repainted. The painter asked if he could make a good job by using for the first coat glue water and ocher, and then putting on two coats of lead and linseed oil paint.

We do not approve of ocher alone as a priming for wood, even when mixed with pure linseed oil, and always advocate the addition of white lead for the purpose. Glue size, when properly applied, is good enough to economize with on interior painting, but will not answer at any time for exterior work. The two coats of lead and linseed oil paint applied over a first coat of glue water and ocher would only mean the waste of a lot of good material and labor, whether it be applied to frame or brick work. Your lead and oil paint is not impervious enough to stop the ingress of moisture and its action on the glue, and even if it were the moisture in the brick would act on the glue and throw off the surface coats. If you must economize, do not attempt to do it on priming, but rather on succeeding coats, because the first coat is to painting what the foundation is to a building. To cheapen the cost of paint and yet obtain fairly good results, it has been recommended that lead and linseed oil be mixed to proper consistency for brushing in one pot, and a similar quantity of bolted whiting with water in another pot, and when well mixed the two are to be thrown together in a larger package and beaten until they are amalgamated, when the required driers are added and the mass strained. This paint when applied in temperate weather and given plenty of time to dry is as good as many of the so-called linseed oil paints on the market, and you need have no apprehension about its use, as you would necessarily have if employing glue size.

— 708 —

Fading of Wall Paper in Light Blue Tint.

In repapering a room where the color of the old paper had stood all right, the old paper was well soaked and scraped off and the walls and ceiling sandpapered well, and repapered with a paper at 40 cents per roll, a light blue tint for ceiling and frieze, and a darker shade of blue on the wall. The frieze and ceiling paper turned white, except in a few spots, while the wall color stood all right. In another room where a yellow tint was used, the paper held its color. The same paste was used on all the work.

Your query is rather difficult to answer. It does not strike us as if your paste were at fault, and yet it may be. The blue tinted paper, at all events, must have been either very sensitive to light or is not alkali proof. It is just possible that your paste was a trifle caustic, or that the paper itself had some caustic properties that the color could not withstand, or, what is most plausible, that the blue used is not light proof. Probably you have some small samples of the paper on hand, or the customer whom you papered the rooms for may have them. If so, expose part of a piece to the direct sunlight for a short time, keeping the other part of same piece in a dark place, and note effect. Also treat a portion of the paper with a weak solution of ammonia and see what happens.

— 709 —

Composition of Steel Color for Painting Machinery.

Steel color paint is a vague term, and the successful formulas are proprietary. We know of dozens of paints that are sold as steel colors to manufacturers of machinery, and each one appears to differ somewhat from the other in depth of shade or hue, in point of fineness, in odor, in time of drying and also in finish. Some are dead flat when dry, others have a high gloss, and others again have a sort of egg-shell finish. Many have the blue-black color of bar steel, others are grayish, while many again are of the brown-black cast. To design or make a paint to imitate the color of steel, it is necessary to first intend for rough work or for fine finished surface. In some cases, too, three and even four coats are applied, two different preparations being used for the various coats, while for ordinary work one or at most two coats are deemed sufficient.

Rapid drying appears to be one of the essential points demanded or expected in these paints, eight hours being the limit permitted on fine work, while four hours for each coat seems to be the time mostly looked for in the drying of the cheaper grades. These quick-drying paints cannot carry much oil in their composition, and therefore the vehicle must be a combination of japan, varnish and turpentine or benzine of a quality to conform to the selling price. The pigments also vary to a great extent, lampblack, drop black, graphite, mineral black, or a mixture of any two of these with a little ultramarine blue or Prussian blue and white lead or zinc white forming the bases, according to the depth of color that may be required.

No doubt in the very cheap grades of these steel colors there are also dilutants in the form of barytes, silice and whiting introduced, especially in such as are offered in paste form.

But the very best grades that are sold at a fair price in a ready-to-use form, and dry with a high finish, appear to be composed of good pigments, ground and mixed with the best coach japan and good coach varnish and thinned with pure turpentine.

— 710 —

To Attach Pearl to Glass Without Marring the Beauty of the Pearl.

Take a clean pencil brush and a little clear damar varnish and go over the openings of the letters, two or three at a time, running a little over on the letter all around. Lay on your pearl carefully, breaking it into the proper size and fitting it as closely together as possible, until the opening is covered. When the varnish is dry and hard, the pearl is firmly attached. Now mix a little silver gray or pearl gray and coat over the pearl, covering all the openings.

— 711 —

Softening Hard Putty to Remove Window Panes Without Breaking.

You can make a batter of caustic soda and soft soap, or take equal parts of potash and fresh slaked lime, both in powder, mixing these with water to the consistency of soft soap, and mix this with a like quantity of soft soap. Apply this with a wooden stick or spatula to the putty, which will soften it in a short time, so that it can be removed with the putty knife. But be careful to keep the mass off your hands, as it is very caustic in either case.

— 712 —

Applying Water Colors to the Plain Side of Wall Paper.

This will depend very much on the quality of the paper. We should say that the paper should be first moistened, then stretched over an appropriate surface and held tight in some way or another. It will not do to dampen it too much, as the color is then liable to strike through from the printed side. At any rate you will require a weak glue size, and this will serve to moisten the paper with. Do not remove the paper until you have applied your water color design and it has fully dried; then it will not wrinkle.

— 713 —

Finishing Hard Wood Mantels.

The work of finishing hard wood mantels is similar to that of finishing any hard wood furniture, and depends very much upon the quality of the goods and their selling price. To go into details, it would be necessary for us to know the particular kind or the various kinds of hard wood to be finished, and therefore we can only give an outline of the ordinary practice. Assuming that the wood is white oak or mahogany, and that the mantel has passed out of the woodworker's hands, it is thoroughly dusted and given one coat of the proper wood filler, a paste filler, thinned with turpentine to the consistency of varnish,

applied in a full flowing coat, natural color in the case of light oak, stained with a little raw sienna and raw umber for dark oak and stained with burnt sienna for mahogany. This coat is allowed to set, say from fifteen to thirty minutes, according to its drying qualities, when the surplus filler is removed by rubbing with excelsior or hair across the grain, so that the grain and pores will remain perfectly filled. After thirty-six hours the filler should be hard enough to permit of sandpapering, which should be done with the grain, never in a rotary motion or across the grain. This done, the work must be again carefully dusted and examined to see whether it has been properly filled, and if not another coat should be given, or at least the defective places be touched up. Use No. 0 sandpaper to remove all particles of filler left on the surface, and dust again. Filler is required on all open grained woods, such as oak, mahogany, chestnut, walnut, ash and butternut, while it is not needed for close grained wood. It is essential to rub the filler well into the wood, and after a good flowing coat has been applied with a soft bristle brush and before it has time to set, but begins to show flat, begin rubbing it into the grain with a piece of leather fastened to a block of wood, while on round work use a long leather strap to draw back and forth around the surface. When the work has been filled and sandpapered smooth, apply one coat of bleached shellac varnish and rub down with No. 1 sandpaper to a smooth surface. For high grade work follow this with bleached shellac varnish, rubbing each coat, when dry, with curled hair and fine pumice, excepting the last coat, which, in case it is to be in high polish, rub first with pumice and water, then with rotten stone and water, and polish with rotten stone and oil. If high gloss is desired, flow on a coat of cabinet varnish and omit rubbing. If eggshell gloss is wanted, rub the last coat with pulverized pumice and raw linseed oil or crude petroleum.

The number of coats of shellac varnish or high grade rubbing varnish, which may be used in place of the shellac after the first coat and with the exception of the finishing coat, is determined by the grade of work desired.

For ordinary mantel work in hard wood, the shellac varnish can be dispensed with and two or more coats of hard oil finish or furniture varnish used instead, but each coat, with the exception of the last, should be haired or mossed, and the last coat treated as above.

— 714 —

Paint for Blackboards Which Cannot Be Marred or Scratched by Chalk.

The best blackboard paint is made by moistening four ounces dry lampblack with alcohol, rubbing it out with a spatula, gradually adding one quart of shellac varnish and stirring into this three ounces flour of pumice and three ounces finely pulverized rotten stone; then straining through a fine sieve or strainer to break up any lumps that may have formed. This is applied quickly to the bare wood, so that no laps are formed, and in one hour's time a second coat may be applied, which, after a day or so, may be haired or mossed. The quantity mentioned should cover five boards four feet square two coats. A

cheaper method is to mix four parts, by weight, of lampblack in japan with one part, by weight, of ultramarine blue, also ground in japan, and one part by weight of washed flour of emery. Add to this one-half part by weight of quick-rubbing varnish as a binder, and thin with turpentine sufficiently to flow on and not show brush marks. Three coats of this should be given, and when dry and hard the finishing coat haired down. A green paint for blackboards has lately come into vogue, and it is claimed that this is more soothing to the eyes than the gray tone given to lampblack. A formula for such paint has been communicated to the Scientific American by Mr. G. H. Bergmann, principal of a school at Charleston, S. C., who claims perfection for it. It is as follows: Equal parts of Prussian blue and chrome green in fine powder, are mixed with gilders' sizing and alcohol, equal parts, sufficient to produce a paint of creamy consistency. Apply with a large, stiff brush quickly and give a second coat after an hour or two. After twenty-four or forty-eight hours it may be smoothed with hair cloth and fine pumice.

— 715 —

Cement for Filling in Brass Signs.

The best filling-in material is made by intimately mixing four ounces genuine asphaltum, four ounces brown shellac and four ounces dry lampblack. The asphaltum and shellac must be powdered, and the mixture is applied by heating the brass plate and melting in the cement. When the letters are filled, the cement is smoothed off with a fairly warm sad iron. When cooled off, scrape off the surplus carefully and hold a warm sad iron over the letters to glaze their surface. Black sealing wax will also answer this purpose, under similar treatment. If the plates cannot be heated, make an unshrinkable black putty by mixing equal parts by measure of genuine asphaltum, varnish and first-class coach japan and working into this enough dry calcined lampblack to make it very stiff. With this fill the spaces, pressing the putty well in with the putty knife, then clean the edges with turpentine. When the filling has become thoroughly hardened, polish the whole plate. The same method will answer for signs of zinc or copper.

— 716 —

Refinishing Oak Doors That Are Badly Weather Stained.

If possible, take the doors off the hinges and lay them down flat on some trusses or old boxes, and remove the old varnish with ammonia or a mixture of two parts strong ammonia and one part of turpentine and benzine, using a stubby brush to get into the cutwork and about mouldings. When all the old varnish has been removed, dope over the stained portions with a strong oxalic acid solution, and see whether you cannot bleach the wood by that operation. If this will not work, you have to resort to staining. Use raw sienna for light effect, and after staining use paste wood filler, colored to match the stain. Then proceed as you would on new work. If the light stain does not hide the weather stains, you will be obliged to use a darker stain and darker filler.

— 717 —

To Keep Back the Water Stain in Kalsomine or Fresco Work.

Water stains are very difficult to overcome, because they are often only shown after the first coat of kalsomine or water color has been applied. If water stains are noted on ceilings, and there is a suspicion that there may be more of them, go over the ceiling first with a thin wash made of whiting and clear water, which, on drying, will show all hidden stains.

If the stain is a bad one, give a coat of a mixture made of equal parts boiled oil, japan and turpentine; when this is dry, give a coat of shellac varnish of good body, then give the spots a coat of white lead in turpentine to dry flat, because kalsomine or water color is liable to scale if put over shellac directly. If the stains are light, one coat of shellac will stop them, but the flat white lead should not be omitted. For cheap work, a wall varnish will serve the same purpose as the shellac, but it is always a safer plan to put a coat of flat white lead over it. When the stain is old and dry and not too dark, and the cause of the stain removed, a piece of white paper carefully pasted over will hide the stain, but, of course, this should be resorted to only in the case of very cheap work.

— 718 —

Imitating Quartered Oak.

It should always be borne in mind that in imitating quartered oak, or any other wood, that it is the natural we wish to imitate and not some one's idea of what it should be. Therefore, it is necessary to first study the various changes of grain and have the general character of the grains of the particular wood impressed on the mind before beginning to work.

In graining to imitate quartered oak, wipe out the champs or veins with the rag, and soften the combed portions between the champs by drawing a rag folded three or four times toward the edges of the work previously wiped out with the rag. The edges of the champs may first be sharpened up by drawing the second joint of the forefinger against them. A fine comb is then lightly waved over the space of open work and the whole panel or mantel blended lightly crosswise with the flat brush. Or the work may be combed as described and permitted to dry before taking out the champs. In that case, when the work is dry, mix a weak solution of sal soda and add to it some dry umber, to show where you touch the work; put the solution on the champs with a fitch tool, let it stand a few minutes to soften the color, and wipe it off with a soft rag. It will be found that the graining color is taken off to the groundwork, giving the same effect as if it had been wiped out while the color was wet, but the work looks cleaner. When done in this way, the work should be overgrained. The champs may also be put on in dark colors over the combed work and left so, as some veins of oak appear dark in certain lights. These dark veins may be imitated by combing the work the same as if one was going to use the rag to wipe out. Do not blend, but put in the veins with a small fitch tool or fresco liner dipped into some color from the bottom of your pot, not

too dark, and immediately blend one way, lifting the edge of the color. After some practice it will be found that a very good imitation of dark champs or veins is the result.

— 719 —

Waterproof Cement.

The following will stand heat and water :

1. Take freshly calcined oyster shell lime, sift it well and grind fine. Make into a paste with white of egg. Apply to the fractures and press broken pieces firmly together.

2. Also boil four parts, by weight, of gum shellac and one part, by weight, of borax in water until shellac is dissolved. Keep on boiling until mixture is of paste-like consistency. When required, heat and apply to fractures with a clean brush.

3. Mix hydraulic lime and water glass.

(Nos. 2 and 3 will not stand heat, but will stand water.)

— 720 —

Imitation of Quartered Oak by the Use of Straight Grained White or Southern Red Oak.

The owner of a new house wanted the painter to finish the oak trim to match some twentieth century oak mantels, antique with elaborate quarter marks, part of which were said by the man who sold the mantels to be artificial, but it is difficult even for an experienced person to detect whether they are natural or not. He asked for the method employed by the finishers in the furniture factories when they take a piece of straight grained oak and make it appear as though it were quartered.

Straight grained oak is cleaned up and dusted, after sandpapering, and the flakes are penciled in with white shellac varnish, then the whole piece of work is stained with a stain made of equal parts of turpentine, asphaltum and coach japan, thinned with turps. When set up the stain is wiped and permitted to dry hard, then the surface is filled with a dark paste filler that is colored with burnt umber and drop black to suit. When the filler is haired off the flakes or high lights are wiped out clean and good and will come up white. When the filler has become good and hard, give the usual coats of shellac and rubbing varnish, and rub with pumice and water or pumice and oil, and then polish in the usual manner. There is no acid used at all in these imitations.

Golden oak finished veneering, often thought to be artificial veneer, is not an imitation, but the natural run of quartered oak and most beautifully marked. It is simply stained with asphaltum, thinned with turpentine, then filled with golden oak paste filler and the flakes are cleaned out by hand before shellacking, which is all the secret attached to the work.

The number of coats of shellac and the number of coats of rubbing and finishing varnish and the labor expended on rubbing and polishing depend entirely on the price obtained for such work.

That a painter or grainer cannot compete on large contracts with a furniture or mantel factory is self-evident, the latter making a profit on the lumber as well as on the other material and labor.

— 721 —

Wax Finish for Interior Work.

If the work is hard wood, use paste filler and shellac varnish to obtain a surface. If soft wood, stain first and use liquid filler or shellac, according to the job. For polishing wax, melt two parts, by weight, of yellow beeswax (pure country quality), and use one part, by weight, of spirits of turpentine to thin the same.

This is for finishing natural wood, after it has been filled and varnished. For simply cleaning up and renewing polished furniture, one part beeswax and three to four parts turpentine make the best liquid. The wax and turpentine furnish the filling medium, and elbow grease does the rest.

— 722 —

To Finish Hard Open Grain Wood in the Highest Grade of Polished Finish.

If the work is rough in places, sponge with clear, cold water; when dry, sandpaper thoroughly.

Fill with a good paste filler well rubbed in with tow and pad, and clean off with excelsior and cheesecloth.

Sandpaper with No. 0 sandpaper, give two coats of grain alcohol shellac, sandpaper well between coats, and then give one coat of cabinet polishing varnish, rub down well with curled hair to a perfectly smooth surface and then flow on a coat of polishing varnish, full body.

This finish should stand at least six days to harden, then rub to a dull, even surface with pumice stone and water. If a polish is desired, follow rubbing with pumice with rotten stone and water, after which give "hand polish."

Graining.

First coat with orange shellac, and after a thorough sandpapering, give two coats of ground, the last coat to be flat, then grain, and after three days varnish with a good quality elastic varnish.

The use of oil in the ground coats or a hard drying, brittle varnish, is the cause of grained work cracking; the graining should stand at least three days before varnishing.

If the woodwork is of select white pine or poplar and a first-class job is desired, prepare with two coats of good varnish for ground, instead of paint, and after a thorough sandpapering, stipple in distemper colors before graining; after graining, finish with one coat of good quality varnish.

Floors—Varnish Finish.

Give one coat of white shellac (if open grained wood specify first a coat of paste filler), then two coats of floor varnish (one pint of turpentine to the gallon), and rub to a dull, even finish with pumice stone and oil.

Wax Finish.

Give one coat of white shellac (or paste filler if open grain wood), then wax to a smooth, even surface with a weighted brush.

Floors can be finished cheaper by substituting liquid filler for shellac, but shellac makes by far the better job.

— 723 —

Formula for Water Proof Cement for China.

Make a paste composed of hydraulic lime and silicate of soda (soluble glass). Make it just before use, as it will harden rapidly.

— 724 —

Probable Cause for the Failure of Paint to Stand in the Repainting of a House.

The questioner had painted a house with a standard brand of white lead and linseed oil made by a well known crusher. In June, ten years later, he started to repaint, using the same brand of white lead, also the colors and oil made by this firm, taking four days to apply the first coat and allowing two weeks before the second, or finishing coat was begun, requiring eleven days to complete the job. The body of the work was French gray, the trim light stone, and the blinds dark green. Inside of three weeks the green paint on the blinds began to look dead and very much faded, the body in less than four months began to fade and appear dead in spots, which showed up lighter than the rest of the surface, while the trim cracked in some places. The material has the best reputation, the house was in fair condition, and the painter had seventeen years' experience.

The brands of material you mention are known to be pure and of established quality, and while the best may sometimes fail, there is, apparently, only one explanation. Unless the painter who mixed the paint, doped the material with some cheap nostrums, it may be taken for granted that the condition of the surface was not in as good a state as you were led to believe, and that you did not have sufficient linseed oil in your first coat to satisfy the dryness or absorption of the surface. If you had given the surface, before applying the first coat of paint, a thin lead and oil wash, we think you would have had better success. It stands to reason that timber, which has not been painted for ten years, is extremely dry and the lead paint, if still there, is in a dried-out, powdery condition, and will absorb the oil from the first coat of paint applied over it. This coat being robbed of some of its oil, in turn robs the finishing coat, and this taking place to a greater extent in some spots than in others, explains the spotted condition of the body color.

That the trimming shows cracks in some places is most likely due to its having been applied on top of the body color, before the latter was thoroughly dry. As to the blinds going in dead in less than three weeks, we judge that to be due to the absence of sufficient oil to hold out the gloss. Commercial chrome greens are not good oil absorbers at any rate, and hence very apt to look dry and faded in a very short space of time. To remedy the trouble and satisfy the owner by the most economical method, we would suggest that you give the blinds a coat of good outside varnish or at least a coat of boiled linseed oil, and that you take boiled linseed oil and go over a small space of the body of the house with a coat of that in order to see whether you cannot restore the original color and make the dry and faded-looking spots disappear by this plan. If this does not succeed, your only remedy will be to give the premises a third coat of paint with a sufficiency of linseed oil of good body all over.

— 725 —

Dressing or Polish for Linoleum Floor Cloth.

One pound yellow beeswax dissolved in one gallon turpentine makes a polish for linoleum cloth. It is applied with a soft rag.

Another good dressing is made by melting five pounds paraffine wax with one pound palm oil. When melted, take from fire and add one pound kerosene oil. Apply with a rag.

— 726 —

An Effective Remover of Paint and Varnish from Floors.

Make a hot solution of caustic potash and apply while hot with swab made of cotton waste. The hardest kind of paint will yield to this in a few minutes, and varnish will not resist much longer. If possible, wear India rubber gloves while working with this lye; at least, be very careful to keep it from touching your skin. As soon as the paint or varnish has been removed, clean up and wash the floor well with clear water and allow to dry before repainting or revarnishing. Should the wood darken as in the case of oak floors, and this be objectionable, go over the floor with dilute muriatic acid; but as soon as the wood is bleached enough, rinse with clear water and then follow with a weak solution of washing soda to neutralize all traces of acid. To apply the dilute acid, use bristle brushes, which are unaffected, unless bound with iron. Cotton swabs or rags will not answer, because the acid will destroy them quickly. While using the caustic soda solution do not wear woolen clothes, unless you have overalls over them, as a drop of the lye, falling on woolen goods, will immediately make a hole.

— 727 —

One Result of Painting with Oil Claimed to Be Better Than Linseed Oil.

A Massachusetts painter was induced to buy some oil that was claimed to be better than linseed oil. Early in the spring he used two gallons of it in paint that was put on the clapboard part of a house. Immediately after application the paint became darker, and it seemed as if all the oil had come to the surface. In two months all the paint could be taken off with a stiff brush, leaving the surface very greasy. This oil, or grease, was removed with benzine, and the surface was repainted with paint containing pure linseed oil and drier only. This appeared in excellent condition until a heavy rain in the middle of December. Where the rain beat against the paint, it looked as though all the color had disappeared, although the paint was still hard as it was where the rain had not touched it and where the color was still intact. Oil applied does not seem to bring back the color.

Although we have not yet received a final report on your sample of oil, we can advise you that it is a nearly pure mineral oil, flavored with a product of the pine or fir tree to disguise the petroleum odor. The iridescence or bloom alone will disclose its origin, although it appears as if some attempt at de-blooming has been made with poor success. Your experience is only another instance of the fallacy of the belief that gold dollars may sometimes be bought for 75 cents or even less.

Of course, when linseed oil is as high price as it has been during the current year, there is a great temptation to find a cheaper substitute, but it should always be borne in mind that every new article should be tested on a small scale before using it, on large or even small jobs, where in case of a failure, it means not only loss of money, but also of reputation. As to the remedy, you did the best there was to be done by taking off the never-drying, greasy paint and washing the bare surface with benzine, and we hardly believe that there was enough mineral oil left remaining in the wood when you repainted to do any damage; nor do we think that the bleaching out of your new paint by that rainstorm was caused by the wood having been still impregnated with mineral oil. You omitted stating which sides of the house were most attacked by the driving rain, or we might have drawn our conclusions more intelligently. Try again a mixture of three-fourths boiled linseed oil and one-quarter turps, applying same with a rag liberally on some of the faded portion of the paint, rubbing it same as in polishing furniture, and if the color does not return and the paint is still hard, then the trouble is due to your coloring matter, and you will be obliged to give at least one new coating; probably a skim coat will do it. Should you find, however, that the paint is chalky, very soft or loose, then you may have to remove it to the bare wood.

— 728 —

Cheap Sizes for Walls to Be Kalsomined or Painted.

It is always best to first go over whitewashed walls with strong vinegar and then give one or preferably two coats of the following size: Soak one pound of good white glue over night in soft water, pour off the cold water and dissolve the glue in hot water in the usual way. Slice one pound rosin soap fine and dissolve in water by heat. Dissolve two pounds alum in hot water. Then stir the dissolved glue and soap together, and when well mixed, put in the alum solution. Now thin the mixture with warm water, until it is of proper consistency for the brush. This size works well over old whitewash or over old kalsomine, and if two coats are applied will keep water stains from showing.

The size, however, should be applied as warm as possible, and if possible, the room should be fairly warm also. A cheap size for new walls to be painted is made as follows: Take five ounces of sal soda, one ounce powdered borax and twenty ounces powdered rosin; stir these into one and one-quarter gallons of boiling water and keep stirring until dissolved. In another vessel have five ounces good white glue dissolved in one gallon of water, to which add one gill (one-quarter pint) of the first solution, and boil both solutions separately for about ten minutes; then mix the two, strain, and the size is ready for use. It is best to apply this warm, and still better if applied over a priming coat of white lead, instead of applying it to the plaster direct, but may be used either way.

— 729 —

Painting Galvanized Iron Cornices and Spouts.

An Illinois painter gives the following as his method for painting galvanized iron and tin on the side (not the roof) of a building:

The galvanized iron is allowed to stand three months exposed to the weather before painting.

For first coat, Venetian red, mixed with raw linseed oil, driers and enough turps to have it dry with dull gloss.

Second coat: White lead, colors to suit, raw linseed oil, dryers and enough turps to also dry with dull gloss.

Third coat: White lead, colors to suit, raw linseed oil and driers, but no turps. This is mixed stout and allowed to stand for five days before using. Giving three coats as described makes the job hold for seven or eight years. In repainting he treats such jobs as he would old woodwork, giving two coats of lead paint.

Your method is, without any doubt, an excellent one, and cannot be criticised, unless on the point of expediency. The success of your method does not have its origin altogether in the materials you employ or in the way you mix and apply them, but is to be looked for chiefly in the fact that you do not touch the metal before it has been exposed for three months to the weather. This exposure produces a gray film of oxidized zinc on the surface, upon which your first coat obtains a good hold. In addition to this, your first coat is thinned, so as to dry with an eggshell gloss. If you gave an all oil paint it would not hold on so well in spite of the gray film of oxidation. The succeeding coats or their composition cut no figure in the adhesion, but only give so much more stability and durability to the work. Now while we commend your methods to our readers, whenever they can follow it to the letter, we must also point out to you where they would be obliged to employ other methods. A job of painting new galvanized iron cannot always be permitted to stand for three months, but very often it is required that it be painted as soon as it is put up, as is the case in the building operations of large cities or in localities where gases abound that would destroy the metal before it had been put up a few months. For such cases we know of a wash that will artificially produce the film in a few hours, for the production of which nature requires months. This wash consists of a solution of one ounce each of chloride of copper, nitrate of copper and sal ammoniac in one-half gallon of water, made in a glass or earthen vessel, and to which, when perfect, one ounce of crude or commercial hydrochloric acid is added. This is applied with a wide, flat brush, and in a few hours the metal turns black, similar to graphite, and on drying becomes a light gray. After twelve hours the non-adhesive salt is removed with a dry brush.

A first coat made of red lead or a mixture of red lead and red oxide or Venetian red, thinned with raw oil, driers and turpentine to dry with eggshell gloss, will hold for years and may be finished with one or two coats of any desired color or oil paint. We prefer a heavy paint in point of specific gravity for this first coat as against those of great bulk and light weight.

A foreign exchange recommends that metallic gray zinc (not zinc oxide), so-called gris, be employed as the pigment for such a priming coat, and linseed oil and driers for the vehicle.

— 730 —

Proper Way to Mix White Lead and Zinc for Exterior House Painting,

We would suggest that 75 per cent. of pure white lead and 25 per cent. zinc white make the best finish in exterior house painting, because the zinc white will not permit the paint to chalk and the white lead will not permit flaking or cracking. The above proportions are intended to mean dry lead and zinc white, hence a mixture of say 73 pounds of pure white lead in oil and 27 pounds of zinc white in oil would answer the purpose.

It is best to break each of these up separately, thin to proper consistency for spreading with raw oil and the necessary drier, mix and run through a paint strainer. If both lead and zinc are of good quality, the quantities mentioned should take up at least six gallons of thinner and cover well. But we do not recommend this combination for priming raw wood. Some writers have recommended equal parts of lead and zinc, others two-thirds lead and one-third zinc, but we think the above the safer proportions.

TESTING PAINT MATERIALS.

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White Lead.

It will be conceded by every member of the craft that to be successful in business depends to a great extent upon a thorough knowledge of the material employed, as well as on the ability to purchase the same; that is, to receive value for value. It is, therefore, necessary for the painter, as well as any other business man, to make frequent tests and comparisons of materials purchased, in order to ascertain where, in these days of sharp competition, he will procure not only the best, but the most economical goods for his particular purposes.

Some brands of material may appear, at first sight, to be cheap, but on close scrutiny or calculation, after practical use, be found very dear in the long run. Not only that, but the use of inferior material may lose the painter the patronage of good customers and ruin a heretofore good reputation.

Recognizing the necessities of some instructions for the younger members of the craft, we propose to point out, in the following pages, a few simple, but practical methods which may be successfully applied in testing and comparing the materials employed by the practical painter, such as white lead, colors, linseed oil, turpentine, etc.

White lead, being the foremost of painters' materials, will receive our attention first. We shall not waste time with a rehearsal of its chemical composition, its origin or the various processes of its manufacture, because that subject has been so thoroughly ventilated in painters' conventions and in the trade publications that it is almost common property. As to the purity of a brand, the name of a reputable corrodor on the package is usually sufficient guarantee. If, however, any suspicions arise, a simple test, which any painter after a short practice can make satisfactorily, consists of the following:

For dry white lead, take a medicinal test tube, thoroughly dry and clean, and place therein about one scruple (20 troy grains) of the suspected article and then fill the tube half full with dilute nitric acid, which can be procured at any drug store. Pure white lead will show effervescence and dissolve completely in a short time, while barytes will remain as an insoluble precipitate in the bottom of the tube. Adulterants of a lighter specific gravity require a chemical knowledge for detection, but are scarcely ever found in dry white lead, because of their greater bulkiness.

For white lead in oil the blowpipe test is recommended as most simple. A gas flame or spirit lamp, a blowpipe and a piece of close-grained charcoal is all that is required. A small cavity dug into the

charcoal, a portion of the lead as large as the head of a very small pea placed into the cavity and the point of the blowpipe directed upon the lead with a steady blast, will readily reduce pure white lead in oil to a button of metallic lead, leaving the charcoal without a trace of any other substance. If any zinc, barytes, whiting, clay or silica be present, even if only to the extent of from five to ten per cent., there will be no formation of the metallic button, but the substance will have the appearance of a whitish, yellow or gray, cinder-like mass. Sulphate of lead can be reduced only with difficulty, after long-continued blast or with the addition of powdered borax as a fusing material.

White lead in oil should be of fair stiffness, not too oily, when taken from the package, especially when wanted for interior work, but have a polished appearance and should not be rough or granular in appearance, though in very cold weather this is not an uncommon occurrence, which will do no real harm, if the grainy character is due to transformation or storing in extremely cold localities, because a few days in a warm place and a little paddling will bring it back to its normal condition. In such cases the granular character of white lead is due to the chilling or solidifying of the linseed oil, in which it is ground. White lead, when thinned with spirits of turpentine only and spread upon a piece of glass, should be a neutral white, showing neither a yellow nor a gray or pinkish cast. Nor should it have the glaring whiteness of zinc white, the nearest approach being that of a clean lime whitewash, not blued. The best comparative test for whites is to spread those to be compared side by side upon a piece of glass or other surface that has previously been coated with a clear, glossy white and allowed to become thoroughly hard, passing judgment only after the whites to be compared have become dry in a dust-free place. The fineness of white lead may be determined by spreading the paste lead upon a piece of smooth glass with a steel spatula that has true, smooth edges. Though the lead may appear rough in this test, no grit must be felt on spreading it. A more accurate test is made by breaking up, say four ounces of the lead with one ounce of turpentine, spreading this mixture on a clean, smooth piece of glass and allowing it to dry, when it must show no sanded appearance, but be perfectly smooth in order to be of required fineness. Good white lead must take up a certain percentage of thinners, so that it will not run or sag, as is the case when it will not absorb a sufficient quantity or will not lay to the surface closely. If too much thinner is required, on the other hand, it is apt to show poor covering properties. Five gallons of raw linseed oil of good body to the 100 pounds white lead in oil is a good, fair standard for finishing coats on exterior housework, though sometimes it may be necessary to have the paint stouter and omit some of the oil in order to save in the number of coats.

The covering, or as ordinarily termed, the body of white lead is best determined by thinning a portion thereof to the proper consistency for application, noting the amounts of lead and thinners used and applying the paint in one, two and three coats over pieces of japanned tin or boards, previously coated with a dead black. White lead of good body, thinned as above stated, will on third coat cover up so well that the black ground is fully obliterated.

To determine the covering properties and value to the consumer of competitive brands of white lead we should proceed as follows: If the test can be made on a small scale only, take as many pieces of black tin as there are brands to be tested, all the pieces to be of similar size and condition, weighing the same and noting weight on the under side of the tin. Now a certain portion of each brand of lead is weighed off, say one pound, and each one thinned with, say six ounces of raw linseed oil, and the lead so thinned spread on evenly and uniformly to the surface of the tin marked with the name or number of the brand, taking care, however, to keep paint off from the edges. Immediately after applying each coat, the tin should again be weighed to determine amount of paint used, and this should be taken into consideration when the degree of covering of each brand is determined.

If the test can be made on a sufficiently large surface, a certain portion of the lead from each brand should be thinned to the proper consistency for application without regard to the quantity of thinners required, but the amount noted for calculation. Using a different brush for each pot of paint, a similar sized area of surface should be coated with each paint, pot, paint and brush to be weighed before starting and after coating the required space. By following either method the covering properties as well as comparative values of each brand can be readily determined.

When, however, there is no large area of surface at hand and the painter desires to test the working properties of white lead, let him select boards that are finished like the sides of a frame dwelling, say about five or six feet long, and ten or twelve inches wide, and paint a broad black stripe about the middle; then treat the board as he would a building, applying first a priming coat, and follow with second and third coats, making notes of the amounts used as well as the working of each lead under the brush, whether the lead is long or short, whether it fills well on priming and how well each brand has covered on the finishing coat. Whenever such tests can be made they are more conclusive; the test on japanned tin is suggested only for comparing small samples.

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Oil Colors.

In testing oil colors for their intrinsic value the practical man will consider tinting strength or staining power and fineness of grinding above everything, and then the brightness, richness or brilliancy of tone, and lastly the opacity, or body of the solid colors and the translucency of the transparent or glazing colors. In the following we shall exclude the consideration of the high-priced artist's colors and deal only with those that are indispensable to the house painter, the decorator and the signwriter.

To test competitive brands of oil colors for their comparative value we would give the following as a guide: Upon opening the respective packages remove the skin, if such has formed on the color, and then with a small paddle or stick beat the contents of package to uniform consistency. Next place a small portion of the color from each package on a piece of clean, smooth glass and work the color backward and

forward with a steel spatula that has true edges, and grit or coarseness will be apparent by scratches on the glass. This test requires some practice and judgment, because the more oily the color the finer it will appear. A more accurate test for fineness is made by thinning certain portions of the competitive brands to equal consistency, applying the material with brushes of same size and character on a smooth surface, and allow it to set up or dry before passing judgment. To determine tinting strength or staining power a certain portion of white lead in oil is weighed off, or as many such portions as there are brands of oil color to be compared, and a much smaller portion of each of the colors are also weighed and with the aid of a steel spatula intimately mixed, without, however, grinding the material. Such tests may be made on a very small scale, or when the painter has use for the material in the near future, it is best to weigh out 100 ounces of white lead and one ounce of color of the strong groups and double or treble that quantity of the weaker stainers. Thinning the various mixings with the necessary oil and driers to proper consistency, they may be applied side by side and allowed to dry hard, when the tinting strength of each may be gauged by the depth of tint produced; and this, if the work has been handled neatly and with clean tools, will also determine purity of tone in each color.

In times of leisure or enforced idleness, however, it will benefit the younger members of the craft to test the samples offered by competitive paint houses or their representatives in tubes, and here the testing must needs be done on a small scale. A large piece of plate glass or a marble slab placed on a bench or table, a small prescription scale, an oil can or oil dropper, and two steel spatulas and a few pieces of glass are all that is required as outfit. Pieces of oiled or glazed paper of equal size and weight may be used to weigh the lead in oil, and the oil colors on and for every brand of color to be tested 100 grains of white lead are weighed out, and then one, two or five grains of each of the colors, according to the supposed tinting power of the color under test. No allowance should be made for softer or stiffer consistency, because it is value that is to be determined, not of the color as a pigment, but as a color in oil. A certain number of drops of oil should be added, an equal number to each of the mixings, and the white lead and color be thoroughly mixed on the slab with a steel spatula without grinding and then placed on clear glass in a sufficiently thick film to cover until all the competitive brands are exposed to view side by side. If the exact value of a color is to be determined, add to the strongest as much white lead as is necessary to reduce it to the same depth of tint as that made by the weakest color. For instance, if one grain of lamp black in oil and 100 grains white lead in oil produce a tint apparently twice as deep as another brand of lampblack, also one grain of black to 100 grains of white lead, then weigh out 250 grains white lead and one grain of the stronger black and keep on adding from the 250 grains of white to the black until a tint similar to the weaker one is obtained; then weigh the remainder of the 250 grains of white, and if 60 grains remain the strong black has a value of 90 per cent. greater as a tinting or staining black.

This rule relates to all oil colors so far as their value for tinting is considered. It may be in place to caution novices to be very careful

to have their slabs, glass and spatulas scrupulously clean before each mixing, in order to give a fair trial to each brand. Wiping cloth, some benzine and pumice stone are indispensable necessities in this connection. To test colors in oil for depth and richness of tone, as well as for shade, it is self-evident that the various brands should each be thinned to a like consistency and applied over the same kind of surface, best over old painted work, and allowed to dry, when an impartial judgment may be had.

As to the determination of the opacity or covering power of the solid colors, each of the competing brands of similar name should be thinned in exactly the same proportion and applied as thinly as possible over a strong contrasting ground and the films allowed to dry, when even the novice will be enabled to note existing differences in covering.

Transparent colors are best thinned and applied in a like manner to clear glass with soft brushes, and their value determined by the translucency of the glaze. Durability and permanency of colors can be satisfactorily determined only by painting the various brands on proper groundwork on panels, exposing to strong light and the elements side by side. An unobstructed southern exposure will give the most rapid results, and as long as the same thinners have been employed the groundwork and surface having been precisely similar, such results should be accepted as conclusive. If the shades of brands of colors of similar nature differ it is best to keep part of the panels inside, away from strong light, in order to facilitate comparison of the exposed samples.

Now, before we proceed to go over the list of colors in detail, it might be well to state that we do not propose to burden this article with a series of chemical tests for which the painter is not equipped, nor for which he has time to spare.

He wants value for value, and by following the foregoing suggestions he can determine readily to his own satisfaction whether or not he obtains the same in his purchases. What he requires is an oil color of buttery consistency, not too oily, not too stiff; a paste that is not inclined to liver or ropiness, that will mix well with any vehicle when properly treated in the thinning process. Nor does he care to have a lot of worthless sediment in his pot after mixing and using part of the color, and, therefore, he should shun goods that are not of good fineness and strength, because adulterated oil colors and great strength or staining power do not go together, because loading colors with cheap bases will just take away from the inherent strength of a pigment to the amount of percentage of dilution or adulteration (extenders of color or paints, as they have been termed by some writers). We shall now proceed to point out certain characteristics of oil colors in detail, beginning with the blacks.

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Blacks.

Of the blacks lampblack is of most interest to the house painter. True lampblack is of great density of color, great bulkiness, and produces a bluish gray tint with white lead. Gas carbon black in oil is

often sold as lampblack, but has a rather brown tone and produces a brownish-gray tint. Lampblack is usually adulterated with barytes or whiting, sometimes with both. In such cases it is far less bulky than the pure article, and lacks in strength. Drop black is, as a rule, of the grayish black type, not as dense as lampblack by long odds, and does not absorb, pound for pound, one-half the amount of thinner, nor has it much more than one-sixth of the tinting strength of lampblack. Its tint with white is also of the brownish-gray order, unless blued, but it produces a far cleaner tint than gas carbon black. Sign writers' black is usually lampblack ground with driers, sometimes drop black and carbon black in combination.

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Blues.

Next to the blacks, in alphabetical order, we have the blue colors. Those of interest to the house painter and signwriter comprise cobalt and ultramarine, Chinese and Prussian blue, as oil colors only. The cobalt and ultramarine blues of commerce are artificial products, but are very staple pigments. Imitation of cobalt blue produces a more opaque effect than the artificial ultramarines, and may be recognized by its more greenish undertone in comparison with the usually violet tone of most of the ultramarine blues. When used with white the tint of imitation of cobalt is not as glaring as that which is produced by the majority of ultramarines. Ultramarine blue can be found in various tones from greenish to distinct violet. The former are usually much stronger, the latter decidedly weaker. Those with a violet tone, however, are best adapted where it is intended to apply varnish, because they are not so apt to show a greenish effect as the other. Adulteration in these blues is rarely met with, and the painter can select his purchases by testing for richness of tone and tinting strength.

Chinese and Prussian blues are of nearly similar composition; the best selections are usually sold as Chinese blue. Those brands that show a pronounced bronze cast are usually strongest, and produce the cleanest tints. The test for strength with white lead will give the best idea as to their real value, and will also give a fairly accurate idea as to clearness of tone. In testing these blues the maximum white and the minimum blue should be employed, because pure Chinese or Prussian blue is one of the very strongest tinting colors at the command of the painter, and the test liable to mislead when the tint is made too strong.

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Browns.

In browns we have umbers, sienna, Van Dyke brown and mineral brown, and these only are of interest to the house painter. Mineral brown, or metallic brown, as it is more familiarly known, is to a great extent used in the painting of roofs and for freight cars and similar work where decorative effects are not required.

Suffice it to say that metallic brown in oil should be of good fineness, of good body and be ground in pure linseed oil to insure durability. A practical comparative test will be the best guide here. Burnt sienna is usually selected by its rich tone as a glaze and superior tinting

strength. When sienna shows up with a fiery transparency it generally gives a clean tint with white, though not necessarily showing great strength. Raw sienna, though sometimes of a decidedly yellow color, may also be dealt with in this group. Like the burnt article, it should show good transparency and greater strength than the best ochre. Fineness of grinding is a requisite for siennas, because it brings out the transparent character of the material.

Raw umber is best when of the olive tone, and in the absence of a reddish or distinctly yellow cast. Burnt umber should be a warm brown, and a slight reddish cast is preferable to a dull, blackish appearance of the solid color. Umbers should be ground very fine and have considerable strength, as they, like sienna, are very useful for staining purposes, and tints made with them are very permanent.

Vandyke brown is more useful in staining and graining than for tinting, where it is not as durable as the umbers or siennas. Fineness of grinding and staining power are important, as is also a good, rich tone.

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Greens.

Greens are next in order, and next to the reds there is quite a selection, of which chrome greens are most notable. There are blue-toned chrome greens and yellow-toned chrome green, chemically pure chrome greens, and many are sold under fancy or proprietary brands or names. When they are chemically pure it is usually so stated on the label, but the commercial brands contain anywhere from 10 to 35 per cent, coloring matter, the balance being a mineral base of some kind, generally barytes. The generally adopted rule, however, appears to be to make them with from 25 to 30 per cent. coloring matter. As to selection of the proper tone, the judgment of the painter must decide whether the bluish or yellowish tone is best suited. Fineness of grinding, brightness of color and working properties should be considered, but as for value a test for tinting strength should determine; however, comparisons should be made only between exactly similar shades and tones of chrome green, as it would be unfair to compare a light with a dark shade or a yellow-toned green with a bluish green. Emerald green, or as it is more familiarly known, Paris green, is very little used nowadays, excepting for ornamenting or for decorations in places where gaslight has a yellowing effect on chrome green. Its purity is best tested by extracting or removing the oil from the pigment with gasoline, and treating the pigment with aqua ammonia in a test tube, which will give a blue solution without any precipitate if the green is pure.

Verona green or terra verte is not generally in use, and no simple test can be given.

For verdigris the remarks apply that were made in reference to emerald green.

Bronze green, Quaker green and bottle green are combinations of black, yellow and blue and no simple tests can be specified.

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Reds.

The group of reds represents quite a variety of types. American vermilion is a chrome red, and though the least brilliant, it is, outside of a few products that have been developed only recently, the most durable of the vermilion group. When pure, it consists of lead chromate and white lead intimately combined, and a test of purity should be left to chemical science; the painter may ascertain its value by comparing the various brands for richness of tone and covering properties.

Carmine and its substitutes should be tested for their value as glazing colors, for their brilliancy, clear transparency and their tinting strength. To ascertain purity of tint it is best to substitute French zinc white that has not been blued in place of white lead, and make the proportions not over 50 parts zinc white to one part of these reds. The substitutes offered for carmine are often as durable as the high-priced article itself, and sometimes more permanent.

English or quicksilver vermilion is the red sulphide of mercury, and under certain conditions it will sooner or later turn into black sulphide of mercury.

The pale shade is very unstaple, and when exposed to strong light it will, even when protected by varnish, turn brown in a few months, while the deep shade becomes very dark inside of six months, and often turns blackish inside of a year or so. To test for purity, heat a small portion over a gas jet or lamp in a porcelain dish in contact with air, and if pure there will be only a trace of ash left; when adulterated with red lead, barytes, etc., these will be left behind. Indian red is usually to be had in two shades, light and dark, and the material is mostly imported from abroad. It is most too solid and strong a color when pure to be of use in the pure state for trimming, etc., and does not look well for that purpose, unless somewhat diluted with a mineral base, but makes an excellent covering material for ground work and has very strong staining properties, making strong pink effects with white. Should be tested for rich tone, fineness of grinding and tinctorial strength. Red lakes are numerous, but the best of them are those derived from the madder root or its principal coloring matter, alizarine, which is now derived from coal tar, and has been proven to be even more staple in point of permanency than the coloring matter extracted from the madder plant, which is fast becoming obsolete. These lakes are usually branded with such prefixes as madder, permanent, durable, etc., and when well made do not belie their fancy title, because they are lime, alkali and light proof and can stand a great amount of heat up to 300 degs. F. without being visibly affected, and the test can be made on that plan, because aniline colors are unable to stand it. Rose lakes are usually made with aniline dyes on a mineral base, such as blanc fixe and alumina, and as a rule are rather fugitive, especially those that are most brilliant in color. Taste and judgment must guide the painter in their selection.

Rose pink is a much needed oil color in the paint shop, and the painter will select the strongest tinter, as it is used for the preparation of stains, for graining and for making tints mostly. Red lead is best bought dry, unless the painter is in close proximity to the base of sup-

ply, and can have it ground to order, because of its drying action on linseed oil and consequent rapid saponification. To test for purity, place a little in a test tube, and boil with diluted nitric acid until decomposed; if there be no insoluble precipitate the red lead is pure. As to its value, test in comparison with other brands for fineness and body, applying it after thinning to proper consistency on smooth, non-absorbent vertical surface, when it must not run or sag. Tuscan red is usually Indian red, brightened with rose pink or red lake. The cheaper grades are simply mixed and ground dry, while the better grades are made by the colormaker in a special process or by special methods. The latter are, therefore, more uniform and more staple, as all possible injurious matters are removed by washing. These better grades of Tuscan reds are not only richer, but are very permanent also, and will stand a very high degree of heat, as well as contact with alkalies and caustics.

Tuscan reds should be tested for richness of tone, for tint and body, and should be compared as to the degrees of heat they are able to withstand without perceptible change, which will give an idea as to their permanency on exposure to strong light.

Venetian reds are either native reds or diluted oxide of iron, and there is no established standard for this material. Burnt ochres are also ground up and sold as Venetian red. English Venetian reds are still in favor, though the bulk of this material is now prepared in the United States and Canada.

The color sold as Venetian red in oil contains anywhere from 15 to 45 per cent. oxide of iron, the remainder consisting of silica, clay, terra alba or carbonate of lime, and some may have all of these combined, either as natural gangue or as a cheapening dilutant. Where Venetian red is to resist the action of sulphur gases it is best to select one that does not contain carbonate of lime (whiting, marble dust, etc.), and whether the red does contain such can be readily determined without extracting the oil. A little of the red is spread upon a dry slab of glass and a few drops of sulphuric acid diluted with a little water poured upon the color. When carbonate of lime is present in any form there will be effervescence in a few minutes, otherwise the material will show but little agitation and remain practically inert.

The value of Venetian red is determined by its brightness, tone, fineness of grinding and comparative absorption of thinners.

Vermilionettes or aniline vermilions are composed of red lead, or orange mineral enriched with the coal tar color known as eosine, and thousands of tons are used annually. The best of these are fleeting, turning to pink or white on long exposure to strong light.

There are a few recent products on the market which bid fair to outlast aniline vermilion as well as quicksilver vermilions three to one, but they are not as rosy as the former, and not as opaque as the latter, though of greater spreading power. Practical tests and tests for permanency only can determine the value of these materials, as tinting strength does not count here. This concludes the red group.

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Yellows.

We now turn to the yellows, which will complete the list. Here we have first the chromes, which may be had in five or six shades, as

canary, lemon, medium, orange, deep orange and even extra dark orange. They are so well known that it is sufficient to say that their value to the painter lies in their purity of tone and tinting strength.

Permanent or perfect yellow is chromate of zinc, and much more permanent to strong light and gases than chrome yellow, but less opaque. It is too poor in body and too high priced for general use, and more adapted to the purpose of the decorator and signwriter.

Ochres are a very interesting material for house painters, and there is a very large variety to select from. They run from palest French or yellow ochre to the deepest English Oxford and the most olive American ochre. They are tested for fineness of grinding, opacity and tinting power. Golden ochres in oil are usually mixtures of yellow ochres of French origin and medium or orange chrome yellow, but are very often adulterated with cheap mineral bases; therefore their value is determined by tests for brilliancy, fineness of grinding and tinting power. Our next chapter will deal with oils, driers and turpentine, etc.

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Thinners.

One of the most important subjects to the painter is the testing of linseed oil, because, so far as we know, all arguments to the contrary notwithstanding, it is the life of all oil paints. When the oil in a paint has perished, it is only a question of a very short time for the pigment to crumble to pieces. Therefore, so long as we have nothing to take its place, we must look toward obtaining the best and purest linseed oil it is possible to purchase. A painter cannot always buy direct from reputable crushers for various reasons, and he should, therefore, post himself on simple tests. All that he requires is a few medicinal test tubes or four-ounce long, round bottles, a small bottle of nitric acid of 1.40 specific gravity, which may be procured from any druggist. When a new lot of oil is received, it should be allowed to rest undisturbed for twenty-four hours in a warm place and then a sample drawn.

This may be tested for color by placing it in the test tube or clear white glass bottle, holding same to the light. Good raw oil should be of a light yellow color; when very greenish the oil is usually made from unripe seed, and not a good article to use in first-class paint. Next, the oil may be tested by the taste, and if adulterated with mineral or rosin oil, the resinous or mineral admixture will make itself unmistakably apparent, while, when the oil is pure linseed, the sensation on the tongue is bland at first, and afterward slightly bitter and rasping, but not offensive and nauseating, as in the presence of mineral and rosin oils. A few drops of raw linseed oil rubbed briskly between the palms of the hands should emit a pleasant linseed oil odor, but not a faint odor even of rosin or an odor resembling machine oil.

The nitric acid test is made by placing equal parts of oil and nitric acid into the test tube and shaking oil and acid thoroughly for a few minutes, allowing tube to set undisturbed for about twenty or thirty minutes, when there will be two stratas or layers noticed, the oil on top, the acid in bottom of tube. When pure, the oil stratum is first a clear greenish yellow, turning to cloudy yellow color, the lower or acid stratum nearly colorless, or at least not more than very pale yellowish.

If fish oil be present, the upper stratum will be a very dark brown, clogged mass, the lower stratum dark orange color. In the case of rosin oil admixture the upper stratum will be from brown to brownish black, according to quantity of rosin oil present and the lower stratum straw color to orange. For the detection of mineral oil the test by rubbing the oil between the hands is almost conclusive, and, further, this admixture shows an iridescence or bloom, which reveals the presence of mineral oil. If a piece of glass is coated with lampblack, a few drops of the suspected oil placed thereon and exposed to strong light, the bloom or iridescence referred to will be strongly apparent. Adulteration with fish oil can also be readily detected by heating the oil, as the nauseating odor cannot be removed by chemical process, though this has been claimed. If the painter can afford it, he should provide himself with a Beaume hydrometer for testing the gravity of linseed oil.

To do this properly a hydrometer jar or other tall vessel is used, the oil placed therein and either warmed or cooled, as the case may be, to a temperature of 59 deg. F., the hydrometer inserted, when it should register neither below 0.930 nor above 0.936, the normal specific gravity of pure raw linseed oil being 0.932, and the weight per United States standard gallon at that temperature—7 $\frac{3}{4}$ pounds.

Raw oil that shows a lower specific gravity than 0.928, is likely to be adulterated with corn oil or mineral oil, and when it is over 0.938, with rosin or fish oil.

Pure raw linseed oil that is applied to a piece of clean, dry glass, which is placed in vertical position and kept in a temperature of 70 deg. F., should produce a thin film, which dries hard and free of tack inside of seven days. Neither should raw linseed oil contain over two per cent. of foots and moisture. As to boiled linseed oil, the tests referred to are not applicable, as the nature of the oil has undergone a change during the boiling process. Oxygen has been introduced in the form of lead salts or manganese salts in order to secure more rapid drying properties. Therefore, boiled oils are heavier bodied than raw oils, and of higher specific gravity, while the color has become considerably darker. If the painter cannot boil the oil himself, he should avoid purchasing "bung-hole" boiled oil and insist on getting pure kettle boiled linseed oil. It has been, and is still, a common practice for dealers to take five gallons of raw oil from a fifty-gallon barrel, and replacing it with five gallons of an inferior liquid drier, selling the mixture at an advance of a few cents per gallon over the price of raw oil as pure kettle boiled linseed oil.

Pure boiled linseed oil should range in specific gravity from 0.936 to 0.946, with an average of 0.942, or closely to 7 lbs. 13 $\frac{1}{2}$ oz. per United States standard gallon of 231 cubic inches, at a temperature of 60 deg. F. It should have an odor more penetrating than that of raw oil, but be devoid of a burnt characteristic and not smell of benzine, rosin or mineral oil. When standing about for a while, oils boiled with litharge or other lead salts, partake of a rather acid odor, while manganese boiled oils become somewhat fishy. When a thin film of pure boiled oil is placed on glass as noted above in the case of raw oil, it should dry hard and free of tack in thirty-six to forty-eight hours, unless it is a pale boiled oil, but even this must dry within sixty hours.

The painter of to-day need not expect to be able to buy any of the olden time cold pressed oil, but he can, by familiarizing himself with the characteristics of linseed oil, buy the very best of hydraulic pressed oil, which, when made from good, ripe seed, is "O. K." for all practical purposes. The oil made by the extracting process (or naphtha process, as it is often called), is not quite so heavy in body as the hydraulic (or hot) pressed; is darker in color and when heated, does not give off as mealy an odor as the latter. In other words, the odor is more pungent and many are opposed to the use of the oil, though it is pure linseed oil with all albuminous matter removed. Bleached or refined linseed oil is very seldom called for by painters, and yet it would be a boon to them, where they are called upon to do interior work in white or in delicate tints. It is scarcely necessary to dwell upon this material, and we would only say that inferior grades of linseed oil cannot be bleached or refined with success, so that when ordered from a reputable manufacturer, the painter is assured of getting what he asks for.

Poppyseed oil is the only drying oil which remains to be considered, and this also is now very seldom employed in house painting, excepting for extra fine white interior work. It is a very pale oil, that on exposure to strong light rapidly bleaches out water white, but is very apt, like olive oil, to become rancid. Its odor is not unlike that of pure olive oil, but somewhat more pungent, and its drying qualities are close to those of raw linseed oil. But there is no other drying oil which allows whites to remain as clear as poppyseed oil that has been bleached by age and light. It is a great favorite with artists and French painters generally, and our supply is imported from France.

Cottonseed oil (non-drying), which was used largely over a decade ago with linseed oil, as a cheapener, is not now a factor with paint men, it having found other markets in the culinary and other arts. Corn oil is a product of recent years, obtained as a by-product in glucose and starch manufacture. It is a nondrying or, at least, very slow drying oil (of less body than linseed oil, with a very sweet, mealy odor), that does not appear to have made much headway as a paint oil. Its presence with linseed oil is readily detected by the heating and drying test.

Turpentine is also a very important factor in the line of thinners, and an article that is subject to adulteration, when prices range high, as they do now and again. Some ten years ago it was a common occurrence to find it adulterated with from 20 to 50 per cent. of waterwhite kerosene oil, and the adulterant was pretty well disguised. The action taken by the Oil, Paint and Varnish Association curbed the practice to a great extent, but it is still carried on in a minor degree, as the suit of a varnish firm in a Philadelphia court of justice two years ago demonstrated, when it was decided that as the largest portion of the material was turpentine, the seller did not misrepresent the goods. That the adulteration was discovered only after much of the goods had been used and spoiled a lot of varnish is beyond comprehension.

Testing spirits of turpentine is very simple. The article should have a sweet odor, characteristic of the pine tree aroma, not too pungent or sour, nor should it smell of petroleum, not even faintly. When drawn from a faucet or spigot it should not foam to any extent, or at least the foam should disappear quickly and not froth, as in coal oil.

A drop of turpentine placed on a piece of white paper should evaporate without leaving a visible mark in five minutes; if not evaporated in eight minutes, it may be put down as fatty, and if a greasy stain remains after fifteen minutes, adulteration with kerosene oil must be looked for. At any rate, the article is unfit for use as spirits of turpentine.

The specific gravity test with the Beaume hydrometer is a pretty safe guard, when coal oil or benzine is used as an adulterant, the proper range being 0.863 to 0.867 at 60 degrees F. If lower than 0.863 adulteration with coal oil or benzine is likely. An admixture of rosin spirit cannot be detected by this test and can be determined only by an expert analyst. However, color, odor and slow drying will be sufficiently indicative of its presence.

That adulterated turpentine is harmful to paint is clear and it is far better for the painter to resort to benzine at once in preference to turpentine and coal oil mixtures. Petroleum spirit or benzine or naphtha, as we know it, is almost indispensable to the paint shop to-day, especially for the sake of economy in cleaning brushes, pots, etc. But it is not confined to this function by any means. Where cheap work, that is to dry flat, is required, it takes the place of turpentine as thinner and has displaced turpentine almost entirely in the large establishments, where agricultural implements and other articles are manufactured. The naphtha or benzine in use is known as 63-degree deodorized and its odor is fair, unlike that of coal oil, and not as pungent as that of the more volatile gasoline, which many use in the place of benzine.

Sixty-three degree benzine should have a specific gravity of 0.725, at 60 degree F., and weigh 6 pounds to the U. S. gallon. It should be water white, free from acid or alkaline reaction, which can be ascertained by the use of litmus paper, and when a drop of it is placed on white paper it must evaporate completely without leaving any stain. Gasoline is unfit for use in place of benzine, because it has a much lower specific gravity and is much more dangerous to have about a shop.

Now we come to the subject of driers. There is quite a variety, but the variety exists more in names than in fact. We have paste driers, liquid driers, lightning driers, pale japans, brown japans and coach japans. The term drier usually indicates that it is an oil drier, while the word japan is usually applied to a drier containing gum in addition to oil as the binding medium, though this does not signify that a liquid drier may not also contain gum.

Patent or paste driers are usually intimate mixtures of lead and zinc salts or manganese salts with white lead, paris white and barytes, but are rarely used by painters at the present time. There was a time when paste driers were much preferred to liquid driers, because of the lesser tendency of the former to discoloration, but since varnish manufacturers are furnishing pale liquid driers, these have the preference, excepting for purposes where the liquid cannot be employed for good reasons. Liquid drier should not be too dark and have a good turpentine odor. When it is dropped on a clean, dry piece of glass and the glass placed vertically in a temperature of not less than 70 degrees F. it should dry to the touch, free of tack, in four hours, and when rubbed

with the finger after twenty-four hours it should not powder off in a fine dust, but remain fairly firm. It must mix with oil without curdling in any proportion and not separate from the oil and fall to the bottom in a curdled mass. When one part of this drier is mixed with three parts of benzine and allowed to stand uncovered for three days the solution must remain clear and show no appreciable separation of linnoxyn on the side of the vessel.

It is clear that a liquid drier that will stand these tests cannot be had at low figures, but it will be a drier that can be depended upon to allow good wear for the paint in which it is used.

Lightning driers are made with and without gum and are usually benzine mixtures. When made without gum they will dry on glass in two hours, otherwise in less than thirty minutes. Under no conditions should they be used by the painter for exposed work, where wear is expected, because they make the oil paint more or less porous and reduce the gloss given to the paint by the oil. The only test necessary is to see that they do not curdle the oil in certain proportions, and that they are satisfactory driers.

Pale japan should not be darker than light amber, and when put on glass in a thin film dry hard in two hours, and when allowed to remain for twenty-four hours it must not powder under the friction of the finger. Must mix freely without curdling with four times its volume of raw linseed oil, and when this mixture is spread on glass it must dry in twelve hours, free of tack in a temperature of 70 degrees F. Brown japan, when applied in a thin film on clean, dry glass, should dry free of tack in two hours, and when rubbed with the finger after forty-eight hours it must not come off in a powder. It should not have a benzine odor and must not curdle the oil in any proportion, but make a mixture that will remain clear at least two hours, nor must the japan coagulate and drop to bottom of vessel.

Coach japan, the necessary adjunct of the car and carriage shop, is somewhat different from ordinary brown japan, and while it, too, should not curdle oil it is hardly ever used with oil colors. When applied to glass, as in the cases before referred to, it should set up and be free of tack in one hour and should not powder when rubbed with the finger in seventy-two hours. Must have a true turpentine odor and should not weigh less than water. When set away in a bottle it should remain clear and not show any appreciable sediment. In conclusion, we would say that the price paid for goods must be considered in passing judgment upon purchases, always being mindful of the fact that first-class goods are best in the long run.

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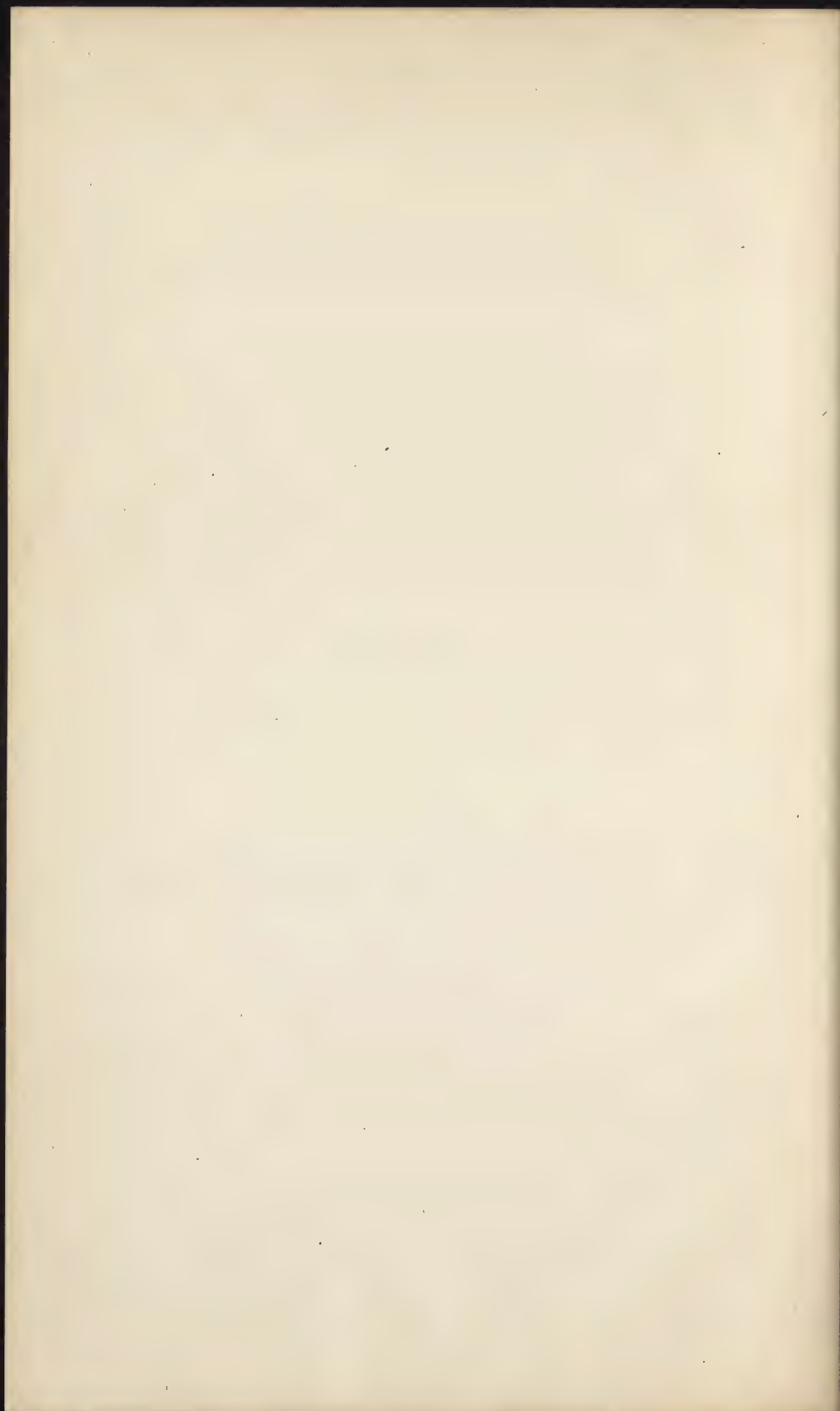
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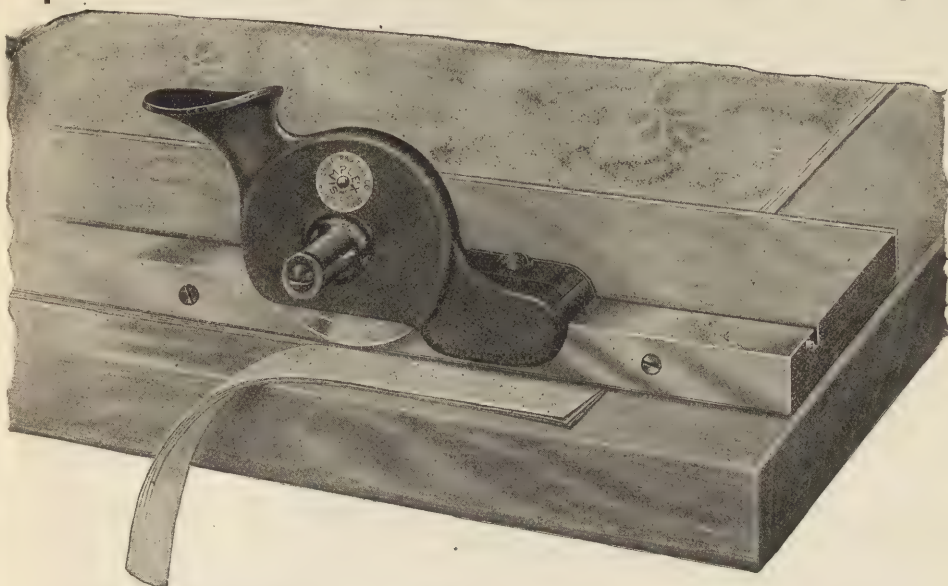
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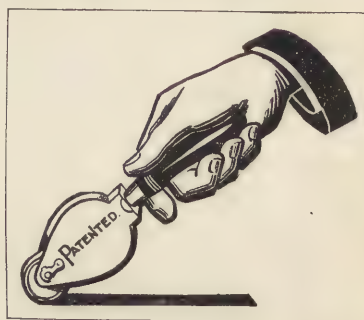
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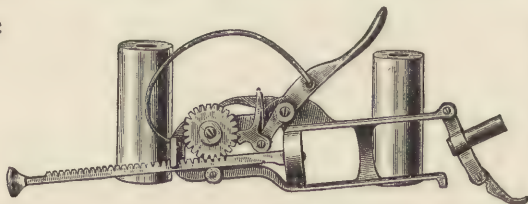
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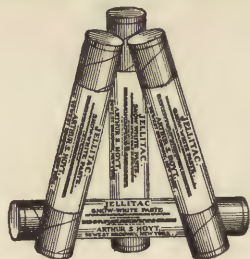
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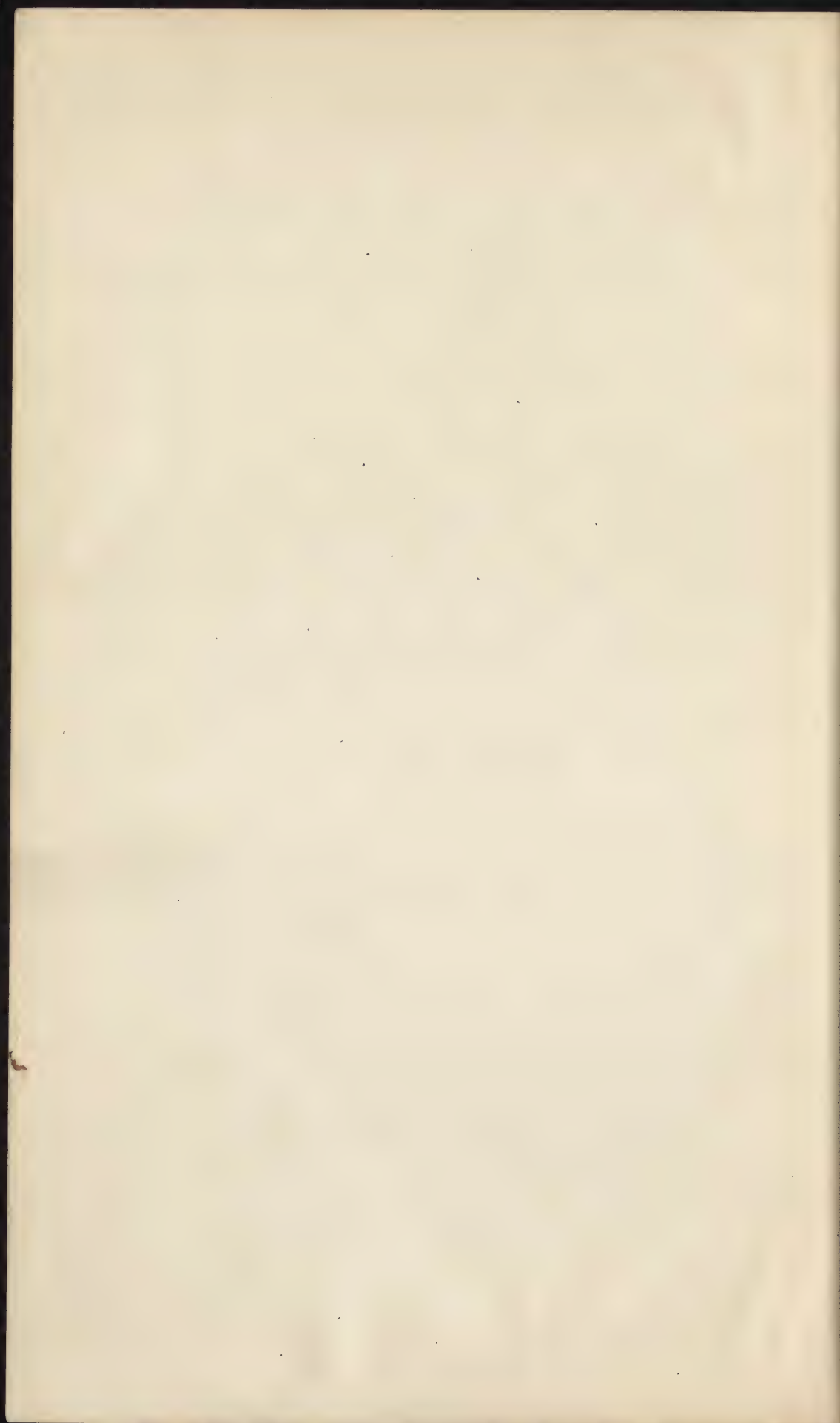
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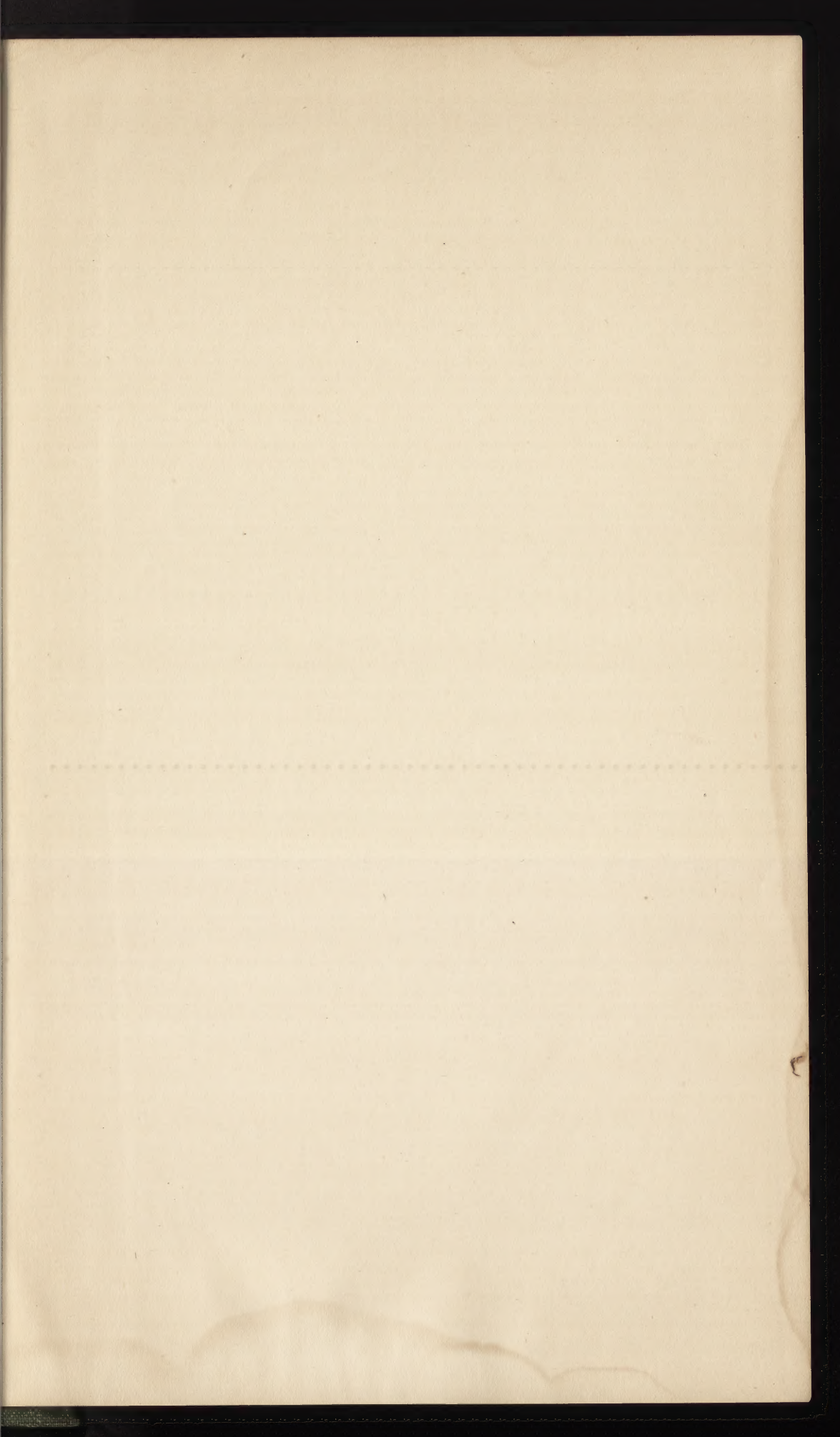
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